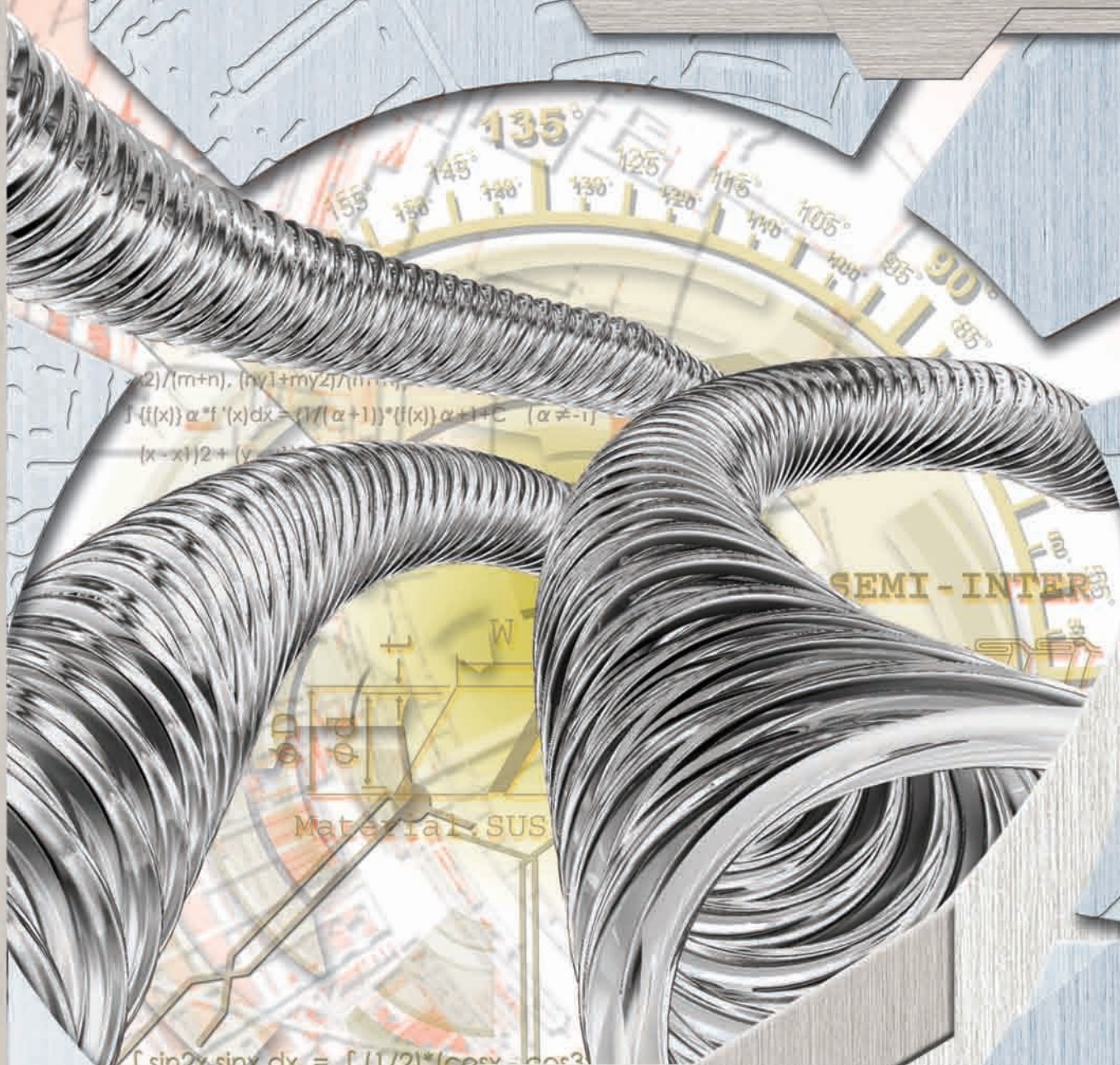


# **FLEXIBLE TUBES & CONNECTORS**



**HAGI**

HAGITEC Co.,LTD.

Ver.002



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## ■ Features

- Impact resistant
- Heat resistant
- Protects from welding sparks
- Permits repeated bending
- Lateral pressure protection
- Protects against optical signal loss

Combined with a Sensor Head Connector, a variety of sensors can be completely protected all the way to the sensor head, even with applications that require movement. Hagitec's flexible metal tubes come in a variety of models with different types of interlock styles and materials available.

Custom-made products can be produced to client specifications for many applications, including:

- Fluids
- Micro-thin applications
- Torque transmission
- Medical applications

## ■ New Product

As a PVC substitute for the flexible metal conduit's sheathing material, Olefin Elastomer was developed as a highly-pliable, low-cost and halogen-free compound. This makes for an environmentally friendly product.

## ■ Applications

For the protection of Optical Fibers and Sensor Cables, Communication Equipment, Medical Equipment, Arcade Game Machines, Robotics and Automation, Lighting, Fiberscopes, Light Guides, Measurement Devices, Microphone Stands, Underground Protective Pipes, Shower Hose Coverings, Gas Water Heaters, and Flexible Outlet Pipes in Water Purifiers

## ■ Insertion

Using special techniques, we can insert approximately 1000 meters of optical fiber or cabling into the flexible tube and package it on a reel.

## ■ PVC Color

Standard: ●Glossy Black, also available Matte Black, ●Green, ●Yellow, ●Blue, ●Orange, ○White, ●Gray, ●Pink, ●Red, ○Clear

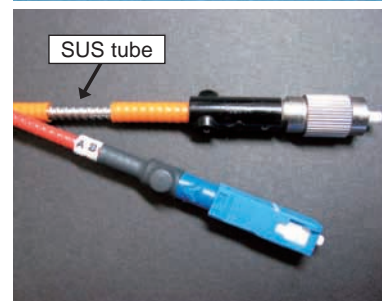
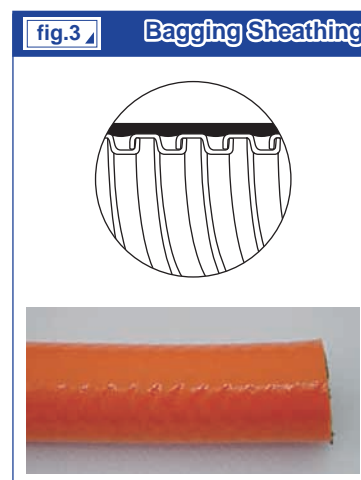
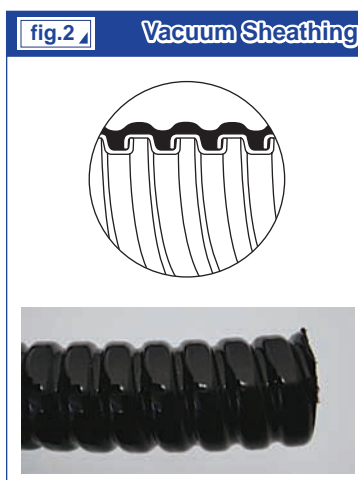
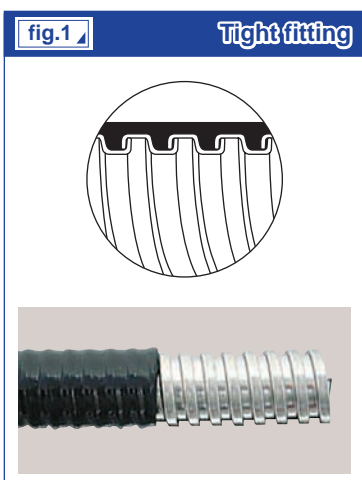
Please specify the requested color after the model number, if other than Glossy Black.

Example: KSP-4N (Pink)

## ■ PVC Sheathing Varieties

There are four types of PVC sheathing available for Square-Lock Type A (Casing) Tubes:

○ <b>Tight-fitting</b>	KSP-_N	Standard item. PVC fills the spiral valley to make the finished surface even and smooth.	<b>fig.1</b>
○ <b>Vacuum Sheathing</b>	KSP-_N-B	During processing, sheathing is applied in a vacuum. The finished surface maintains the spiral pattern of the coil.	<b>fig.2</b>
○ <b>Bagging Sheathing</b>	KSP-_N-F	Sheathing is applied only on the surface of tube and the spiral valley contains no PVC, however the surface will be completely smooth.	<b>fig.3</b>
○ <b>Heat Shrink Sheathing</b>	KSP-_N	Please contact us for details.	



## ■ Features

- General-purpose, standard stock item
- Lightweight
- Pliable
- Non-stretch
- High tensile strength
- Resists lateral pressure
- Excellent bending characteristics
- KSP & KSO types are mist-proof and oil resistant (standard color: black)

## ■ Materials

- Flexible Tube: Stainless Steel
- Sheathing: Soft Polyvinyl-Chloride (PVC), Olefin Elastomer (new product)

## ■ Optional Materials for

- Flexible Tube: Titanium, Brass, Copper, Aluminum, Galvanized Copper
- Sheathing: Polyethylene (PE), Silicone Rubber (Si), Fluorocarbon Resin (ETFE.FEP), Stainless Steel Braiding (B) \*Please refer to page 13 in this catalog for more details.
- Sheathing Combinations: Stainless Steel Braiding+PVC, Kevlar+PVC, etc.

## ■ Applications

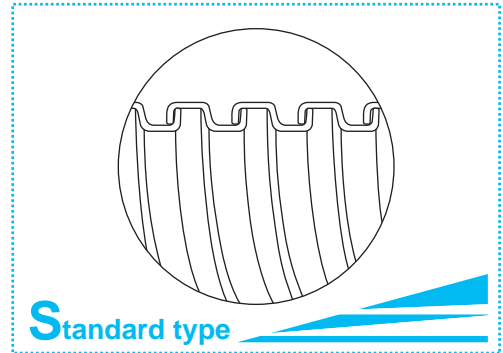
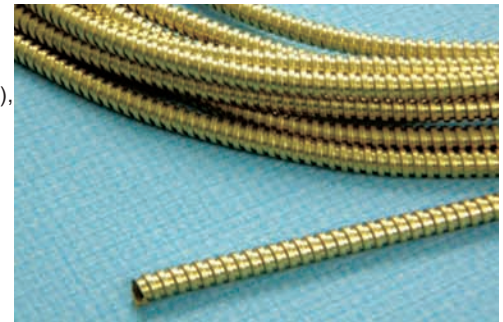
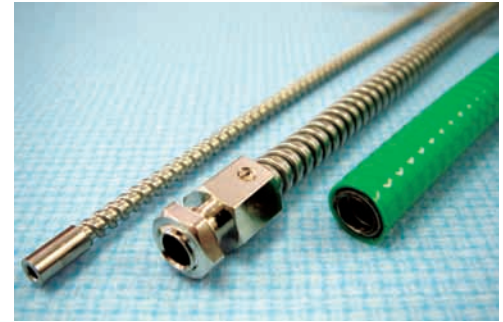
- Optical fiber and sensor cable protection
- Communication Equipment
- Medical Equipment
- Arcade game machines
- Robotics and automation
- Lighting
- Fiberscopes
- Light guides
- Measurement devices

## ■ About Standard Length

Standard length of tube is approx. 100m, consisting of two or three shorter lengths of tubing, for example: 75m+25m, 45m+55m, etc. Please contact us if you need a tube without connections.

## ■ Notes

1. Delivery time will be 14 to 21 days after receipt of order.
2. Upon request, we will accept orders for the insertion of optical fibers or cable harnesses into the tubing.



● Standard type										● PVC coating type									
Model	± 0.2mm (inch)	ID	± 0.2mm (inch)	OD	Bending Radius (mm)	Length (m)	Approx Weight (g/m)	Max Length one stretch (m)	Standard stock	Model	± 0.3mm (inch)	OD	Length (m)	Approx Weight (g/m)	Max Length one stretch (m)	Standard stock			
SÜ-1.2N	1.2±0.14(0.047)	2.3±0.14(0.091)	23	100	12	250	○			SÜP-1.2N	3.04(0.118)	100	18	250	○				
SÜ-1.5N	1.5±0.14(0.059)	2.6±0.14(0.102)	23	100	14	250	○			SÜP-1.5N	3.44(0.134)	100	20	250	○				
SÜ-1.8N	1.84(0.071)	2.94(0.114)	23	100	15	300	○			SÜP-1.8N	3.74(0.145)	100	25	300	○				
SÜ-2.2N	2.24(0.087)	3.44(0.134)	20	100	16	300	○			SÜP-2.2N	4.44(0.173)	100	38	300	○				
SÜ-2.6N	2.64(0.102)	3.84(0.150)	20	100	19	300	○			SÜP-2.6N	4.84(0.189)	100	40	300	○				
SÜ-4P	3.04(0.118)	4.64(0.181)	18	100	30	300	○			SÜP-3N	6.14(0.240)	100	60	300	○				
SÜ-3.2N	3.24(0.126)	4.84(0.189)	18	100	32	300	○			SÜP-3.2N	6.34(0.248)	100	62	300	○				
SÜ-3.5N	3.54(0.138)	5.04(0.197)	19	100	34	300	○			SÜP-3.5N	6.14(0.240)	100	65	300	○				
SÜ-4P	4.04(0.157)	5.64(0.220)	19	100	36	150	○			SÜP-4N	7.04(0.276)	100	66	150	○				
SÜ-6P	5.04(0.197)	7.04(0.276)	24	100	45	100	○			SÜP-5N	8.54(0.335)	100	70	100	○				
SÜ-6P	6.04(0.236)	8.04(0.315)	25	100	60	100	○			SÜP-6N	9.24(0.362)	100	100	100	○				
SÜ-7P	7.04(0.276)	9.04(0.354)	27	100	62	100	○			SÜP-7N	10.04(0.394)	100	116	100	○				
SÜ-8P	8.04(0.315)	10.04(0.394)	30	100	75	100	○			SÜP-8N	11.44(0.449)	100	120	100	○				
SÜ-9P	9.54(0.374)	12.34(0.484)	31	50	110	50	○			SÜP-9N	14.24(0.559)	50	170	50	○				
SÜ-10P	10.04(0.394)	12.74(0.500)	32±8	50	115	50	○			SÜP-10N	14.74(0.579)	50	175	50	○				
SÜ-11N	11.04(0.433)	13.74(0.539)	33±8	50	120	50	○			SÜP-11N	15.94(0.626)	50	180	50	○				
SÜ-12N	12.04(0.472)	14.84(0.582)	33±8	50	125	50	○			SÜP-12N	16.64(0.653)	50	190	50	○				
SÜ-13N	13.04(0.512)	15.84(0.622)	31±8	50	130	50	○			SÜP-13N	17.74(0.697)	50	200	50	○				
SÜ-14N	14.0±0.34(0.551)	17.0±0.34(0.669)	36±8	50	135	50	○			SÜP-14N	19.04(0.748)	50	260	50	○				
SÜ-15P	15.8±0.34(0.622)	18.9±0.34(0.744)	36±10	50	170	50	○			SÜP-15N	21.04(0.827)	50	310	50	○				
SÜ-19N	19.1±0.34(0.752)	22.5±0.34(0.886)	50±10	50	210	15	○			SÜP-19N	24.54(0.965)	50	325	15	○				
SÜ-22N	20.8±0.34(0.819)	24.8±0.54(0.976)	70±15	50	215	15	○			SÜP-22N	26.3±0.54(1.035)	50	565	15	○				
SÜ-25N	25.4±0.34(1.000)	29.2±0.54(1.150)	80±15	50	225	15	○			SÜP-25N	32.0±0.54(1.260)	50	580	15	○				
SÜ-28P	26.4±0.54(1.039)	30.9±0.54(1.217)	80±15	50	340	15	○			SÜP-28N	33.0±0.54(1.299)	50			○				
SÜ-31P	31.8±0.54(1.252)	36.0±0.54(1.417)	90±15	30	490		○			SÜP-31N	39.5±0.54(1.555)	30			▲				
SÜ-36N	35.0±0.54(1.378)	39.5±0.54(1.555)	100±15	30	540		▲			SÜP-36N	41.8±0.54(1.646)	30			▲				
SÜ-39P	38.1±0.84(1.500)	42.1±0.84(1.657)	110±20	30			▲			SÜP-39N	46.0±0.84(1.811)	30			▲				
SÜ-42N	40.0±0.84(1.575)	44.0±0.84(1.732)	110±20	30			▲			SÜP-42N	48.0±0.84(1.890)	30			▲				
SÜ-51N	50.8±0.84(2.000)	54.8±0.84(2.157)	125±30	20			▲			SÜP-51N	58.8±1.04(2.315)	20			▲				
SÜ-54P	51.3±0.84(2.020)	55.3±0.84(2.177)	125±30	20			▲			SÜP-54P	59.3±1.04(2.335)	20							

KS-63N to 104N/ Special order

KSP/OD will be produced by customer request.

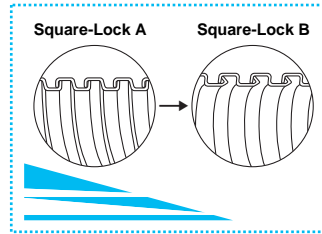
\*Standard stock ○=HAGITEC standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

## Square-Lock Casing Type B (Semi-Casing Tube)

HAGI TUBE

### ■ Features

- General purpose
- Lightweight
- Pliable
- Better twist resistance than KS-\*\*\*N



Flexible Conduit

●Standard type								●PVC coating type									
Model	± 0.2mm (inch)	ID (inch)	± 0.2mm (inch)	OD (inch)	Bending Radius (mm)	Length (m)	Approx Weight (g/m)	Max Length one stretch (m)	Standard stock	Model	± 0.2mm (inch)	ID (inch)	OD (inch)	Length (m)	Approx Weight (g/m)	Max Length one stretch (m)	Standard stock
SKS-8N	7.9 (0.311)		10.0 (0.394)		38	100	88	100	▲	SKSP-8N	11.4 (0.449)			100	100	100	▲
SKS-9N	9.4 (0.370)		12.3 (0.484)		45	50	140	50	○	SKSP-9N	14.2±0.3 (0.559)			50	Please ask	50	○
SKS-10N	9.8 (0.386)		12.7 (0.500)		45	50	148	50	▲	SKSP-10N	14.7±0.3 (0.579)			50	Please ask	50	▲
SKS-11N	10.8 (0.425)		13.7 (0.539)		47	50	158	50	▲	SKSP-11N	15.9±0.3 (0.626)			50	Please ask	50	▲
SKS-12N	11.9 (0.469)		14.8 (0.583)		50	50	165	50	▲	SKSP-12N	16.1±0.3 (0.634)			50	Please ask	50	▲
SKS-13N	12.8 (0.504)		15.8 (0.622)		52	50	178	50	▲	SKSP-13N	17.7±0.3 (0.697)			50	Please ask	50	▲
SKS-15N	15.8±0.3 (0.622)		18.9±0.3 (0.744)		55	50	260	50	▲	SKSP-15N	21.0±0.3 (0.827)			50	Please ask	50	▲
※Standard stock    ○=HAGITEC standard stock item. Stock quantity is 10 to 500m.    ▲=Semi-standard stock																	

※Standard stock ○=HAGITEC standard stock item. Stock quantity is 10 to 500m. ▲=Semi-standard stock

e-flex®

HAGI TUBE

### ■ Features

Standard stock item. Olefin Elastomer is the new ECO material for HAGITUBE sheathing which can be substituted for PVC. This makes it a highly pliable product that is chemical and weather resistant. Best of all, this product does not contain any lead or other halogen compounds, making it ROHS compliant.

### ■ Olefin System Elastomer

PVC substitute, highly pliable with superior weather resistance  
 <YUhdfccZi d'hc U'a Ul ja i a '\*\$'  
 GHUbXUfX'7c'cf. ●Matte Black  
 CH.YfV&c'fg. ●6'i Yz ●M'ckz ●fYYbz ●F YXz ●Purple,  
 ○K \jYz'fDYUgY V&bUW'i g'Z'f'Y'a jba i a 'cfXYf'ei Ubj'mt.

### ■ Materials

- Flexible Tube: Stainless Steel
- Sheathing: Olefin Elastomer (new product)
- Sheathing Color: ●Matte Black
- Sheathing Type: Tight-Fitting

### ■ Note

Other colors and heat resistance grades available on custom orders.



Model	ID ± 0.2mm (inch)	OD ± 0.2mm (inch)	Bending Radius ± 5 (mm)	Length (m)	Approx Weight/m (g)	Max Length one stretch (m)	Standard stock
KSO-1.2N	1.2±0.1 (0.047)	3.0±0.1 (0.118)	23	100	18	250	▲
KSO-1.5N	1.5±0.1 (0.059)	3.4±0.1 (0.134)	23	100	20	250	▲
KSO-1.8N	1.8 (0.071)	3.7 (0.146)	23	100	25	300	○
KSO-2.2N	2.2 (0.087)	4.4 (0.173)	20	100	38	300	▲
KSO-2.6N	2.6 (0.102)	4.8 (0.189)	20	100	40	300	○
KSO-3N	3.0 (0.118)	6.1 (0.240)	18	100	60	300	○
KSO-3.2N	3.2 (0.126)	6.3 (0.248)	18	100	62	300	▲
KSO-3.5N	3.5 (0.138)	6.1 (0.240)	19	100	65	300	▲
KSO-4N	4.0 (0.157)	7.0 (0.276)	19	100	66	150	○
KSO-5N	5.0 (0.197)	8.5 (0.335)	24	100	70	100	○
KSO-6N	6.0 (0.236)	9.2 (0.362)	25	100	100	100	○
KSO-7N	7.0 (0.276)	10.0 (0.394)	27	100	116	100	○
KSO-8N	8.0 (0.315)	11.4 (0.449)	30	100	120	100	○
KSO-9N	9.5 (0.374)	14.2±0.3 (0.559)	31	100	170	50	○
KSO-10N	10.0 (0.394)	14.7±0.3 (0.579)	32±8	100	175	50	▲
KSO-11N	11.0 (0.433)	15.9±0.3 (0.626)	33±8	100	180	50	▲
KSO-13N	13.0 (0.512)	17.7±0.3 (0.697)	31±8	100	200	50	○
KSO-14N	14.0 (0.551)	19.0±0.3 (0.748)	36±8	100	260	50	▲
KSO-15N	15.8±0.3 (0.622)	21.0±0.3 (0.827)	36±10	100	310	50	▲

※Standard stock

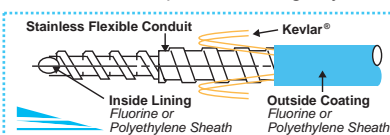
○=HAGITEC standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

## 3-Layer Stainless Flexible Conduit

HAGI TUBE

### ■ Features

The 3-Layer Stainless Flexible Conduit consists of 3 layers of tubing. A stainless steel casing tube (Flexible Conduit) is lined with a fluorine or polyethylene sheath inside. The outside of the stainless tube is coated with another fluorine or polyethylene layer. The inner tube (sheath) clings to the surface of the stainless tube, preventing the conduit from stretching, shrinking, and/or misting inside. These unique characteristics of the 3-Layer Stainless Flexible Conduit make it ideal for wiring optical fibers in automobiles, airplanes, sewage systems and other extreme environments.



\*Kevlar® sheathing can be applied upon request.  
 \*Contact us for more details.



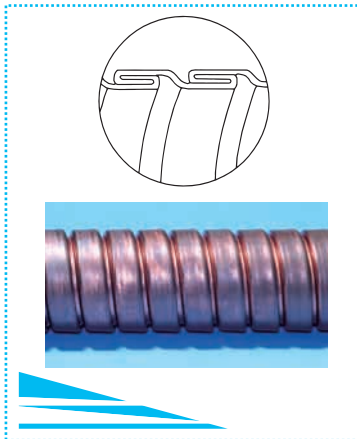
## Features

- Connected more firmly than Square-Lock
- Resists lateral pressure, twisting and pulling (in normal use, they do not come apart)
- Excellent pliability
- Withstands repeated bending
- Optimum protection for optical fiber

## Applications

- Optical fiber protection
- Electrical wire protection
- Shower hose coverings
- Cable harness protection, such as in arcade game machines.

Production is scheduled after receiving order.  
(Some sizes are in standard stock.)



## Standard type

Model	ID ± 0.2mm (inch)	OD ± 0.2mm (inch)	Bending Radius ± 10 (mm)	Standard Length (m)	Approx Weight (g/m)	Max length one stretch (m)	Standard stock
SA-2.6N	2.6 $\phi$ (0.102)	3.9 $\phi$ (0.153)	28	100	-	100	▲
SA-3N	3.0 $\phi$ (0.118)	5.0 $\phi$ (0.197)	30	100	52	100	▲
SA-4N	4.0 $\phi$ (0.157)	6.0 $\phi$ (0.236)	37	100	56	100	▲
SA-5N	5.0 $\phi$ (0.197)	7.1 $\phi$ (0.280)	23	100	60	100	▲
SA-6N	6.0 $\phi$ (0.236)	8.0 $\phi$ (0.315)	23	100	64	100	▲
SA-7N	7.0 $\phi$ (0.276)	9.0 $\phi$ (0.354)	25	100	68	100	▲
SA-8N	8.0 $\phi$ (0.315)	10.0 $\phi$ (0.394)	25	100	72	100	▲
SA-9N	9.5 $\phi$ (0.374)	12.2 $\phi$ (0.480)	30	100	76	100	▲
SA-13N	12.5±0.3 $\phi$ (0.492)	15.2±0.3 $\phi$ (0.598)	40	50	Please ask	Please ask	▲
SA-15N	15.8±0.3 $\phi$ (0.622)	18.5±0.3 $\phi$ (0.728)	50	50	208	Please ask	▲
SA-19N	19.1±0.3 $\phi$ (0.752)	21.8±0.3 $\phi$ (0.858)	60	50	Please ask	Please ask	▲
SA-25N	25.4±0.3 $\phi$ (1.000)	28.1±0.4 $\phi$ (1.106)	70	50	287	Please ask	▲

※Standard stock ○=HAGITEC standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

## PVC coating type

Model	OD ± 0.3mm (inch)	Standard Length (m)	Approx Weight (g/m)	Standard stock
SAP-2.6N	4.9 <del>4</del> (0.193)	100	Please ask	▲
SAP-3N	6.0 <del>4</del> (0.236)	100	Please ask	▲
SAP-4N	7.5 <del>4</del> (0.295)	100	Please ask	▲
SAP-5N	8.5 <del>4</del> (0.335)	100	Please ask	▲
SAP-6N	9.6 <del>4</del> (0.378)	100	Please ask	▲
SAP-7N	11.0 <del>4</del> (0.433)	100	Please ask	▲
SAP-8N	12.0 <del>4</del> (0.472)	100	Please ask	▲
SAP-9N	14.0 <del>4</del> (0.551)	50	Please ask	▲
SAP-13N	17.2 <del>4</del> (0.677)	50	Please ask	▲
SAP-15N	21.0±0.4 <del>4</del> (0.827)	50	Please ask	▲
SAP-19N	25.0±0.4 <del>4</del> (0.984)	50	Please ask	▲
SAP-25N	32.0±0.5 <del>4</del> (1.260)	30	Please ask	▲

# Square-Lock Type A (Casing Tube) with Double Wire

## Features

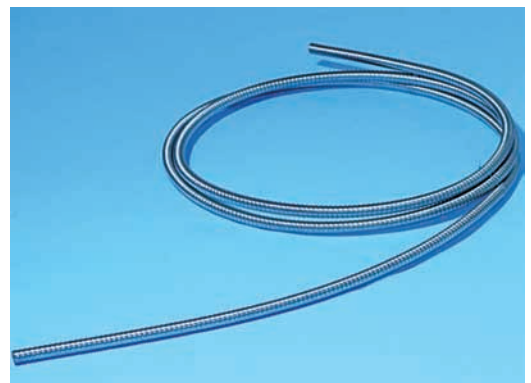
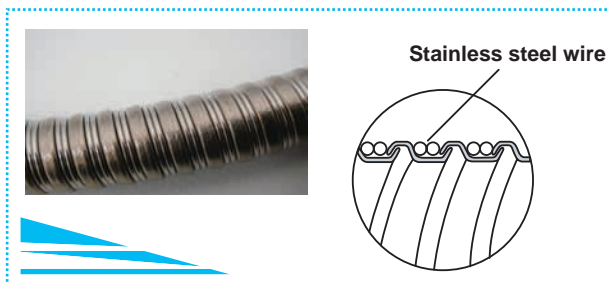
- Stainless steel wire is inserted into the spiral valley of the Square-Lock Type A (Casing Tube) to create a larger bending radius. (It is also possible to modify the bending radius by changing the wire diameter and rod.)
- Can be made ultra lightweight and strong by adding a strip of titanium. (The wire rod will be stainless steel.)
- Excellent pliability and withstands repeated bending.

The doubling of the stainless steel wire produces a stable outer tube diameter. The increased stability eliminates elasticity and provides optimum protection for optical fibers, especially for quartz-type and hollow optical fibers.

## Applications

Protection for large bending radius optical fibers.

Production is scheduled after receiving order.



## Standard type

Model	ID ± 0.2mm (inch)	OD ± 0.2mm (inch)	Bending Radius ± 0.2 (mm)	Standard Length (m)	Approx Weight (g/m)	Max Length one stretch (m)	Standard stock
KSWSP-2.6N	2.6 <del>φ</del> (0.102)	3.8 <del>φ</del> (0.150)	30	100	27	10	▲
KSWSP-3N	3.0 <del>φ</del> (0.118)	4.6 <del>φ</del> (0.181)	30	100	33	10	▲
KSWSP-3.2N	3.2 <del>φ</del> (0.126)	4.8 <del>φ</del> (0.189)	30	100	35	10	▲
KSWSP-3.5N	3.5 <del>φ</del> (0.138)	5.0 <del>φ</del> (0.197)	75	100	37	10	▲
KSWSP-4N	4.0 <del>φ</del> (0.157)	6.0 <del>φ</del> (0.236)	40	100	40	10	▲
KSWSP-5N	5.0 <del>φ</del> (0.197)	7.0 <del>φ</del> (0.276)	50	100	52	10	▲
KSWSP-6N	6.0 <del>φ</del> (0.236)	8.0 <del>φ</del> (0.315)	70	100	64	10	▲
KSWSP-8N	8.0 <del>φ</del> (0.315)	10.0 <del>φ</del> (0.394)	55	100	Please ask		▲

## PVC coating type

Model	Standard OD ± 0.2mm (inch)	Standard Length (m)	Approx Weight (g/m)	Standard stock
KWSPP-2.6N	4.8 $\phi$ (0.189)	100	40	▲
KWSPP-3N	6.1 $\phi$ (0.240)	100	49	▲
KWSPP-3.2N	6.3 $\phi$ (0.248)	100	51	▲
KWSPP-3.5N	6.1 $\phi$ (0.240)	100	54	▲
KWSPP-4N	7.0 $\phi$ (0.276)	100	59	▲
KWSPP-5N	8.5 $\phi$ (0.335)	100	76	▲
KWSPP-6N	9.2 $\phi$ (0.362)	100	94	▲
KWSPP-8N	11.4 $\phi$ (0.449)	100	106	▲

※Standard stock ○=HAGITEC standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

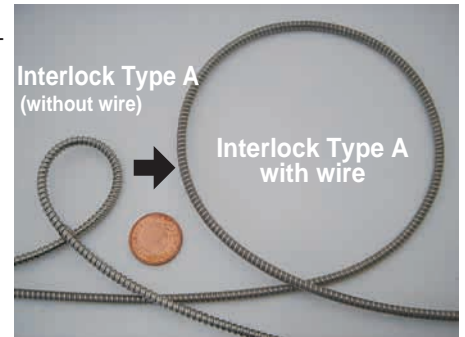
## Features

- Stainless steel wire is inserted into the spiral valley of the Interlock Type A Conduit (Semi-Inter Tube) to create a larger bending radius. (It is also possible to modify the bending radius by changing the wire diameter and rod.)
- Excellent pliability and withstands repeated bending.

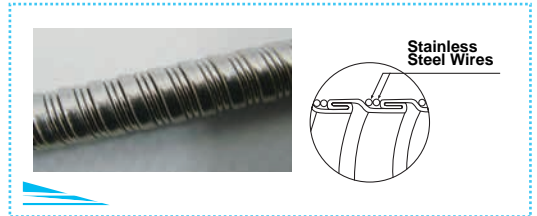
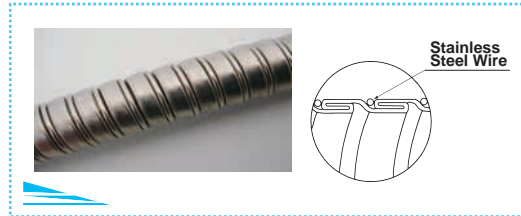
The doubling of the stainless steel wire produces a stable outer tube diameter. The increased stability eliminates elasticity and provides optimum protection for optical fibers, especially for those used in lasers, as well as quartz-type and hollow optical fibers, etc.

## Applications

- Protection of optical fibers in dental lasers
- High-power lasers and welding machines



Production is scheduled after receiving order.  
(Some sizes are in standard stock.)



Standard type									PVC coating type						
Model	ID ± 0.2mm (inch)	OD ± 0.3mm (inch)	Bending Radius ± 30 (mm)	Standard Length (m)	Approx Weight (g/m)	Max Length one stretch (m)	Standard stock		Model	OD ± 0.3mm (inch)	Standard Length (m)	Approx Weight (g/m)	Max Length one stretch (m)	Standard stock	
SA(W)SP-3.2N	3.2 (0.126)	5.2 (0.205)	60	100	67	10	▲		SA(W)SPP-3.2N	6.5 (0.256)	100	99	10	▲	
SA(W)SP-4N	4.0 (0.157)	6.0 (0.236)	70	30	70	10	▲		SA(W)SPP-4N	7.0 (0.276)	30	103	10	▲	
SA(W)SP-4.5N	4.5 (0.177)	6.5 (0.256)	80	30	72	10	▲		SA(W)SPP-4.5N	7.7 (0.303)	30	106	10	▲	
SA(W)SP-5N	5.0 (0.197)	7.0 (0.276)	80	30	74	10	▲		SA(W)SPP-5N	8.6 (0.339)	30	109	10	▲	
SA(W)SP-6N	6.0 (0.236)	8.0 (0.315)	110	30	77	10	▲		SA(W)SPP-6N	9.6 (0.378)	30	113	10	▲	
SA(W)SP-7N	7.0 (0.276)	9.3 (0.366)	115	30	80	10	▲		SA(W)SPP-7N	11.0 (0.433)	30	118	10	▲	
SA(W)SP-8N	8.0 (0.315)	10.2 (0.402)	113	30	83	10	▲		SA(W)SPP-8N	12.0 (0.472)	30	122	10	▲	
SA(W)SP-9N	9.5 (0.374)	12.2 (0.480)	100	30	86	10	▲		SA(W)SPP-9N	14.0 (0.551)	30	126	10	▲	
SA(W)SP-10N	10.0 (0.394)	13.0 (0.512)	150	30	90	10	▲		SA(W)SPP-10N	15.4 (0.606)	30	132	10	▲	
SA(W)SP-11N	11.0 (0.433)	14.2 (0.559)	300	30	Please ask		▲		SA(W)SPP-11N	16.5 (0.650)	30	Please ask		▲	

※Standard stock ○=HAGITEC standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

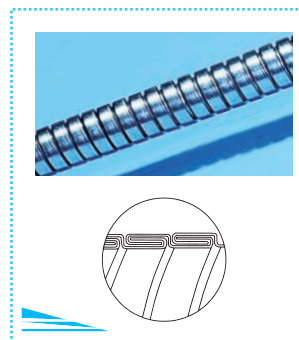
# Interlock Type B Conduit (Semi-Interlock Tube)

## Features

- Strong interlocking
- Resists lateral pressure and pulling
- Non-stretch
- Large bending radius and rigidity, for optimum protection of quartz-type optical fiber

## Applications

Protection of quartz-type optical fibers.  
Production is scheduled after receiving order.  
(Some sizes are in standard stock.)



●Standard type									●Polyethylene covered type					
Model	ID ± 0.2mm (inch)	OD ± 0.2mm (inch)	Bending Radius ± 15 (mm)	Standard Length (m)	Approx Weight (g/m)	Max Length one stretch (m)	Standard stock		Model	ID ± 0.2mm (inch)	OD Standard Length (m)	Approx Weight (g/m)	Max Length one stretch (m)	Standard stock
SX-4N	4.0 (0.157)	5.8 (0.228)	35	100	Please ask		○		SXPE-4N	7.0 (0.276)	100	Please ask		▲
SX-5N	5.0 (0.197)	6.7 (0.264)	50	100	Please ask		○		SXPE-5N	7.7 (0.303)	100	Please ask		▲
SX-6N	6.0 (0.236)	7.9 (0.311)	50	100	Please ask		▲		SXPE-6N	9.4 (0.370)	100	Please ask		▲
SX-7N	7.0 (0.276)	8.9 (0.350)	60	100	Please ask		▲		SXPE-7N	10.4 (0.409)	100	Please ask		▲
SX-8N	8.0 (0.315)	9.8 (0.386)	70	100	Please ask		○		SXPE-8N	11.7 (0.461)	100	Please ask		▲
SX-9N	9.5 (0.374)	12.0 (0.472)	80	50	Please ask		○		SXPE-9N	13.5 (0.531)	50	Please ask		▲
SX-13N	12.5±0.3 (0.492)	15.0±0.3 (0.591)	90±20	50	Please ask		▲		SXPE-13N	16.5 (0.650)	50	Please ask		▲
SX-15N	15.8±0.3 (0.622)	18.3±0.3 (0.720)	90±30	50	Please ask		▲		SXPE-15N	20.0±0.4 (0.787)	50	Please ask		▲
SX-19N	19.1±0.3 (0.752)	22.1±0.3 (0.870)	95±30	30	Please ask		▲		SXPE-19N	24.0±0.4 (0.945)	30	Please ask		▲
SX-25N	25.4±0.4 (1.000)	28.5±0.5 (1.122)	110±40	30	Please ask		▲		SXPE-25N	30.5±0.5 (1.201)	30	Please ask		▲

SX-10N to 75N are special order items. Please inquire.

※Standard stock ○=HAGITEC standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

## Features

- No interlockings, but rather a spring-like stainless steel coil
- Superior pliability
- Resists lateral pressure
- No limitation of the inner or outer diameter
- Normally used with PVC sheathing or stainless steel braiding
- Available in various lengths to prevent stretching.

## About Standard Length

Standard length is approximately 100m. Connecting length is approximately 10 to 16m per piece. Longer products (over 100m, depending on material and finished product) are available upon request. Please contact us for details.

## Note

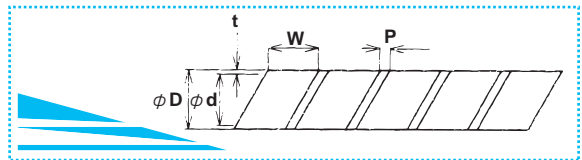
1. Inner diameter: 1.0 to 10mm. Product is scheduled after receiving order. (Some items are in stock)
2. Standard length: 100m.
3. Dimensions (ID, OD, Pitch, Weight, Max Length) show the standard sheathing.
4. For extra-sturdy lateral pressure protection, a double-layered mono-coil is also available.

## Materials

Liner: Stainless Steel, SK Material, Flat Wire  
Sheathing: Polyethylene (PE), PVC, Stainless Steel Braiding

## Applications

- Endoscopes (medical equipment)
- Optical fiber and sensor cable protection
- Concrete vibrator
- Guide for lawnmowers (SK Material, Flat Wire).



●Standard type										●PVC coating type					
Model L- d -D-W-P	ID mm (inch)(d)	OD mm (inch)(D)	Thickness Material (mm)(t)	Width Material (mm)(W)	Pitch (mm) (P)	Approx Weight (g/m)	Max Length one stretch (m)	Stock		Model LP- d -D-d2-W-P	ID mm (inch)(d2)	OD mm (inch)(D2)	Approx Weight (g/m)	Max Length one stretch (m)	Stock
L-0.23-0.33-0.1-0.1	0.23 (0.0092)	0.33 (0.0132)	0.05	0.1	0.1	Please ask		special order		-	-	-	-	-	-
L-0.7-0.8-1.2-0.3	0.7 (0.028)	0.8 (0.031)	0.05	1.2	0.3	3	10	▲		LP-0.7-0.8-1.2-1.2-0.3	1.2 (0.047)		4	10	▲
L-1.7-2.0-1.2-0.2	1.7 (0.067)	2.0 (0.079)	0.15	1.2	0.2	7	15	▲		LP-1.7-2.0-2.4-1.2-0.2	2.4 (0.094)		8	15	○
L-2.2-2.6-1.2-0.2	2.2 (0.087)	2.6 (0.102)	0.2	1.2	0.2	12	15	▲		LP-2.2-2.6-3.2-1.2-0.3	3.2 (0.126)		14	15	▲
L-2.8-3.2-1.2-0.3	2.8 (0.110)	3.2 (0.126)	0.2	1.2	0.3	17	15	○		LP-2.8-3.2-4.2-1.2-0.3	4.2 (0.165)		19	15	○
L-3.1-3.5-1.2-0.3	3.1 (0.122)	3.5 (0.138)	0.2	1.2	0.3	20	15	▲		LP-3.1-3.5-4.1-1.2-0.3	4.1 (0.161)		22	15	▲
L-3.5-3.9-2.0-0.1	3.5 (0.138)	4.1 (0.161)	0.2	2	0.1	25	20	▲		LP-3.5-3.9-4.7-1.2-0.1	4.7 (0.185)		29	20	▲
L-4.0-4.6-2.0-0.3	4.0 (0.157)	4.6 (0.181)	0.3	2	0.3	30	15	○		LP-4.0-4.6-5.4-2.0-0.3	5.4 (0.213)		37	15	○
L-5.0-5.6-2.0-0.3	5.0 (0.197)	5.6 (0.220)	0.3	2	0.3	42	15	○		LP-5.0-5.6-6.5-2.0-0.3	6.5 (0.256)		50	15	○
L-7.0-7.6-2.0-0.3	7.0 (0.276)	7.6 (0.299)	0.3	2	0.3	48	10	○		LP-7.0-7.6-8.5-2.0-0.3	8.5 (0.335)		63	10	○

※Standard stock ○=HAGITEC standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

# Steel-Braided Mono-Coil (Liner Braid Tube)

## Features

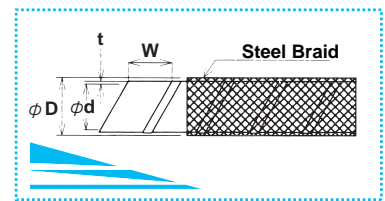
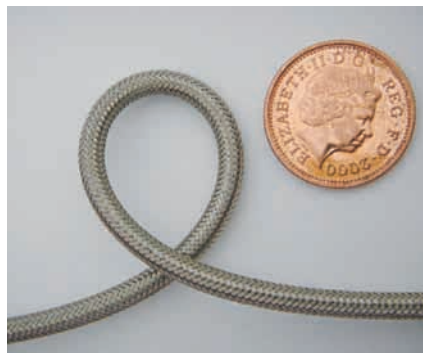
- Stainless steel braid sheathing on mono-coil
- Superior pliability
- Micro-diameter has very small bending radius
- Optimum protection for optical fiber and cable

## Materials

Mono-Coil: Stainless Steel  
Sheathing: Stainless Steel Braid

## About Standard Length

Standard length is approx. 100m. Connecting length is approximately 10 to 16m per piece. Longer products (over 100m, depending on material and finished product) are available by special order. Please contact us for details.



## Note

1. Custom sizes are available.
2. Please contact us for edge trimming of the finished product, since cutting the braided sheathing would open the assembly.

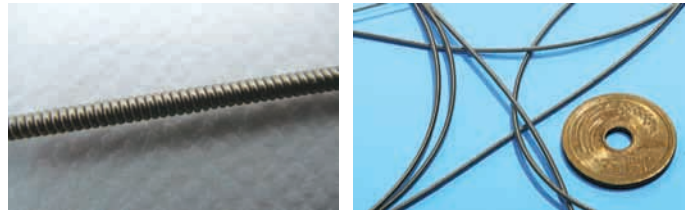
Model LB-d-d1-D-W-P	ID mm (inch)(d)	OD mm (inch)(D)	Material Thickness (mm)(t)	Material Width (mm)(W)	Pitch (mm)(P)	Braid wire diameter (mm)	Bending Radius (mm)	Approx. Weight (g/m)	Max Length one stretch (m)	Stock
LB-1.7-2.0-2.4-1.2-0.2	1.7 (0.067)	2.4 (0.094)	0.15	1.2	0.2	0.07	9	8	15	▲
LB-2.1-2.5-2.9-2-0.2	2.1 (0.083)	2.9 (0.114)	0.2	2	0.2	0.07	10	15	15	○
LB-2.8-3.2-3.6-2-0.3	2.8 (0.110)	3.6 (0.142)	0.2	2	0.3	0.07	12	23	15	○
LB-3.2-3.6-4.0-2-0.2	3.2 (0.126)	4.0 (0.157)	0.2	2	0.2	0.07	13	23	15	○
LB-4.0-4.6-5.0-2-0.2	4.0 (0.157)	5.0 (0.197)	0.3	2	0.2	0.07	15	28	15	▲

※Standard stock ○=HAGITEC standard stock item. Stock quantity will be 10 to 500m. ▲=contact us



## ■ Features

This is a densely coiled round wire, @springlike capabilities. When coiled, holding a few wire rods, it can be used as an ultra flexible wire guide. This product @-Á-Ä-@}•?Á-^}\*@and Á suitable as an outer support for Ándoscopá applications in medical and industrial environments.

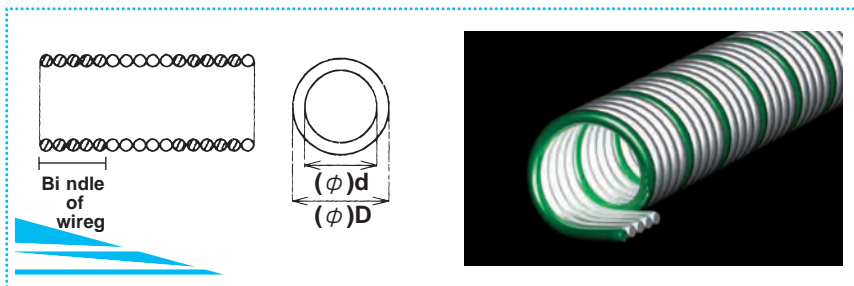


## ■ Applications

As a strain relief product for medical and industrial endoscopes.  
Standard, and diameters  $\varnothing$  { 0.15, 0.2, 0.4, 0.45, 0.5

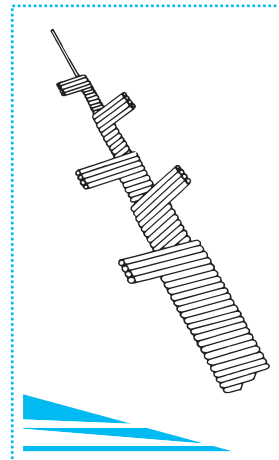
Model	ID $\Delta m$ (inch)(d)	OD $\Delta m$ (inch)(D)	$\Upsilon \bar{a}^{\wedge} \cdot \bar{a} \bar{a}^{\sim} \} \bar{a}^{\vee}$	Max Length $\bar{a}$ Une Ütrec@	Üq &
SP-0.6-1.0-5	0.6 (0.024)	1.0 (0.039)	5	Please ask	▲
SP-1.0-1.4-5	1.0 (0.039)	1.4 (0.055)	5	Please ask	▲
SP-1.5-1.9-5	1.5 (0.059)	1.9 (0.075)	5	Please ask	▲
SP-10-14-5	10.0 (0.394)	14.0 (0.551)	5	Please ask	▲

※Standard stock ○=HAGITEC standard stock item. Stock quantity will be 10 to 500m. ▲=contact us



## Flexible Shaft (Hollow type available) cb fYei Yglt

## ■ Features

[illegible]

## ■ Applications

Surgical drills and equipment that requires flexible connections.

## ■ Materials

Piano wire, Hard Steel wire, SUS304

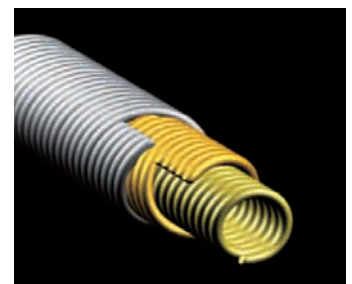
## ■ Minimum bending radius in use

T in.  $\frac{1}{4}$  \*  $\frac{1}{2}$  x Outer Diameter (approx.)

Standard,  $\bar{a} = \bar{A} / \bar{d}$  (diameter)  $\bar{A} \in \{0.12, 0.15, 0.18, 0.2\}$  (SUS Steel Wire)  
 $\bar{d} \in \{0.3, 0.35, 0.4, 0.6, 0.7, 0.8, 1.0, 1.2, 1.4, 1.6, 1.8, 2.0, 2.5, 3.0, 3.2\}$  (G6, 3.2 (Hard Steel Wire & SUS wire))

Model	OD (mm/inch)	Min Bending Radius (mm)	Approx Weight (g)	Max Length (m)	Return Stock
FS-3	3.0 (0.118)	50	44	Please ask	▲
FS-4	4.0 (0.157)	60	78	Please ask	▲
FS-5	5.0 (0.197)	60	123	Please ask	▲
FS-6	6.0 (0.236)	100	168	Please ask	▲
FS-8	8.0 (0.315)	130	329	Please ask	▲
FS-10	10.0 (0.394)	150	480	Please ask	▲
FS-13	13.0 (0.512)	180	830	Please ask	▲
FS-15	15.0 (0.591)	250	1080	Please ask	▲

※Standard stock ○=HAGITEC standard stock item. Stock quantity will be 10 to 500m. ▲=contact us



## Features

- Maintains its bent form
- Non-stretch and manufactured with a cotton packing thread to prevent fluid leakage.
- Excellent vibration absorption.
- Can be painted, plated or have PVC sheathing applied. (Some models are standard stock. Others are produced after receiving order.)

## Applications

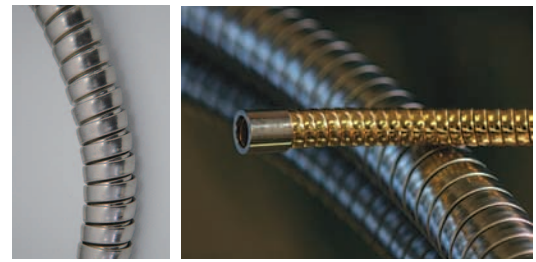
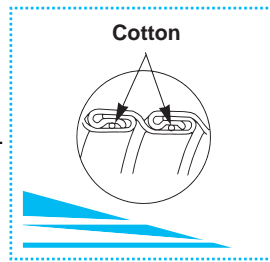
- Optical fiber protection
- Light guides
- Microphone stands
- Exhaust pipes
- Fine particle delivery pipes
- Gas water heaters
- Water purifiers and treatment equipment
- Flexible faucets
- Buried pipeline protection

## Materials

Stainless steel

## Note

- Without Packing Thread  
Models IS-6N through IS-100N available with cotton thread. All models available without packing. Specify 'NP' after IS when requesting conduit with no packing thread. (Example: ISNP-9N)
- Length is 10 to 16 meters per piece.
- Please contact us for terminal fittings and tube specifications, if other than standard product



Standard type										PVC coating type									
Model	± 0.2mm (inch)	± 0.3mm (inch)	OD Bending Radius ± 30 (mm)	Standard Length (m)	Approx Weight (g/m)	Max Length one stretch (m)	Standard stock			Model	± 0.3mm (inch)	ID Standard Length (m)	Approx Weight (g/m)	Max Length one stretch (m)	Standard stock				
IS-4N	4.0 (0.157)	6.1 (0.240)	35	10	70	20	○			ISP-4N	7.2 (0.283)	100	90	20	▲				
IS-5N	5.0 (0.197)	7.2 (0.283)	50	100	120	20	○			ISP-5N	8.4 (0.331)	100	160	20	▲				
IS-6N	6.0 (0.236)	8.4 (0.331)	55	100	130	20	▲			ISP-6N	9.6 (0.378)	100	160	20	▲				
IS-7N	7.0 (0.276)	9.2 (0.362)	55	100	140	20	▲			ISP-7N	10.7 (0.421)	100	200	20	▲				
IS-8N	8.0 (0.315)	10.5 (0.413)	55	100	160	20	○			ISP-8N	12.0 (0.472)	100	210	20	▲				
IS-9NT	9.5 (0.374)	12.5 (0.492)	45	50	180	20	○			ISP-9NT	14.0 (0.551)	50	240	20	▲				
IS-9N-120G	9.5 (0.374)	12.7 (0.500)	45	50	180	20	○			ISP-9N-120G	14.0 (0.551)	50	240	20	▲				
IS-9N	9.9 (0.390)	12.7 (0.500)	60	50	180	20	○			ISP-9N	14.0 (0.551)	50	340	20	▲				
IS-13N	12.5 (0.492)	15.3 (0.602)	70	50	255	20	○			ISP-13N	17.0 (0.669)	50	400	20	▲				
IS-15N	15.8±0.3 (0.622)	18.6 (0.732)	70	50	280	20	○			ISP-15N	21.0±0.4 (0.827)	50	460	20	▲				
IS-19N	19.1±0.5 (0.752)	22.1±0.5 (0.870)	90±20	50	330	20	▲			ISP-19N	24.5±0.5 (0.965)	50	570	20	▲				
IS-25N	25.4±0.5 (1.000)	28.9±0.5 (1.138)	110±20	30	430	20	▲			ISP-25N	32.0±0.5 (1.260)	30		Please ask	▲				
IS-31N	31.8±0.5 (1.252)	37.5±0.5 (1.476)	350±35	30		Please ask	▲			ISP-31N	41.8±0.5 (1.646)	30		Please ask	▲				
IS-39N	38.1±0.5 (1.500)	43.6±0.5 (1.717)	350±35	30		Please ask	▲			ISP-39N	48.0±0.5 (1.890)	30		Please ask	▲				
IS-51N	50.8±0.5 (2.000)	56.3±0.5 (2.217)	400±40	10		Please ask	▲												
IS-63N	63.5±0.8 (2.500)	69.0±0.8 (2.717)	450±45	10		Please ask	▲												
IS-75N	76.4±0.8 (3.008)	82.0±0.8 (3.228)	600±60	10		Please ask	▲												
IS-90N	89.0±0.8 (3.504)	95.0±0.8 (3.740)	700±70	10		Please ask	▲												
IS-100N	101.0±1.0 (3.976)	107.0±1.0 (4.213)	800±100	10		Please ask	▲												

※Standard stock ○=HAGITEC standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

# Gooseneck (Stand Tube)

## Features

- Combination of round and triangular rods.
- Can be bent easily
- Holds bent form and will support weight on distal end of tube.
- Working load can be enhanced by inserting a sub-strength material
- Exterior can be improved with metal plating, painting or PVC sheathing

## Applications

- Light guides
- Microphone stands
- Light stands
- Fixed auto accessories

## Materials

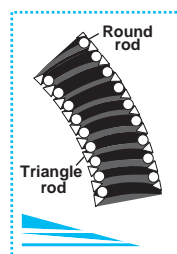
Hard and soft steel wire rods

## Surface treatment

- Plating (chrome, black chrome, nickel, zinc)
- Painting (sprayed, burnt)

## Note

- Available up to CD-25.
- Pliability of the tube can be modified on request.
- Supplied with metal fittings.
- Please contact us for other options.



Model	± 0.2mm (inch)	ID ± 0.2mm (inch)	OD ± 0.2mm (inch)	Bend Radius	Max Length with plating (mm)	Standard stock
CD-5	1.5 (0.059)	5.0 (0.197)				▲
CD-6	2.8 (0.110)	6.0 (0.236)				▲
CD-7	3.5 (0.138)	7.0 (0.276)				▲
CD-9	4.5 (0.177)	9.0 (0.354)				▲
CD-10	5.0 (0.197)	10.0 (0.394)				▲
CD-11	5.5 (0.217)	11.0 (0.433)				▲
CD-13	6.0 (0.236)	13.0 (0.512)				▲
CD-15	8.0 (0.315)	15.0 (0.591)				▲
CD-20	10.0 (0.394)	20.0 (0.787)				▲
CD-22	12.0 (0.472)	22.0 (0.866)				▲

※Standard stock ○=HAGITEC standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

# Micro-Gooseneck (Micro-Stand Tube)

## Features

- Small outer diameter
- Lightweight
- Bends smoothly
- Holds bent form
- Can be sheathed with heat shrink tubing, making it airtight with an attractive exterior.

## Applications

- Headset microphone holder
- LED light guides and other lightweight goods
- Fixed tube for oxygen regulators and inhalators

## Materials

Stainless steel and copper wire



Model	± 0.2mm (inch)	ID ± 0.2mm (inch)	OD ± 0.2mm (inch)	Bending Radius	Length (m)	Standard stock
MCD-3.6	1.3 (0.051)	3.6 (0.142)				▲
MCD-4.0	1.5 (0.059)	4.0 (0.157)				▲
MCD-4.8	2.4 (0.094)	4.8 (0.189)				▲
MCD-5.0	2.6 (0.102)	5.0 (0.197)				▲
MCD-5.3	3.0 (0.118)	5.3 (0.209)				▲

※Standard stock

○=HAGITEC standard stock item. Stock quantity will be 10 to 500m. ▲=contact us





# Dual-Layer Gooseneck (Double Stand Tube)

HAGI TUBE

## ■ Features

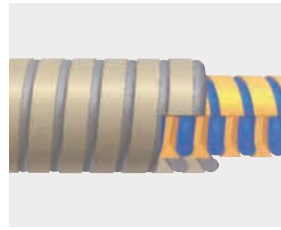
- Double-layered Gooseneck Tube
- Excellent shaping ability
- Suitable for environments where there is vibration and stability is required
- Successfully passed in-house bending tests of over 230,000 repetitions
- Suitable for food processing and medical equipment

## ■ Applications

Shape-retaining tubing for aerospace, automotive and lighting applications.

## ■ Material

Stainless steel (hard steel wire also available on request.)



Model	ID ± 0.2mm (inch)	OD ± 0.2mm (inch)	Bending Radius	Approx Weight (g/m)	Max Length one stretch (m)	Standard stock
WCD-12 (SUS)	4.0 (0.157)	11.6 (0.457)	Please inquire.		10	▲
WCD-13 (SUS)	5.0 (0.197)	12.8 (0.504)			10	▲

※ Standard stock ○=HAGITEC standard stock item.  
Stock quantity will be 10 to 500m. ▲=contact us

# Decabon Tube

HAGI TUBE

## ■ Features

- Maintains bent form
- Aluminum pipe in the core, covered with high-density polyethylene
- Lightweight tube bends easily
- Holds small bending radius
- Suitable for the protection of cables and other items that require mounting and need to maintain shape
- As an air delivery pipe, it has only one joint, making it easier for piping and connecting to the housing.

## ■ Applications

- Headset microphone holder
- LED and other lightweight lightguides
- Fixed regulator tubes for oxygen inhalators

## ■ Usage Specifications

Fluid: Air

Temperature range: -40℃ ~ +60℃

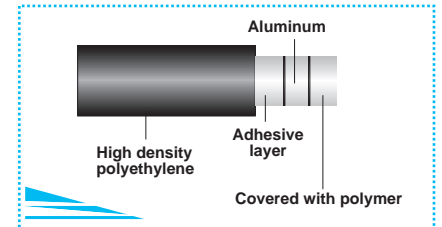
Connector: Special Decabon Tube Quick-seal Joint

△Do not use any other joint.

Negative pressure capability: Flattens when negative pressure is applied, but does not deform.

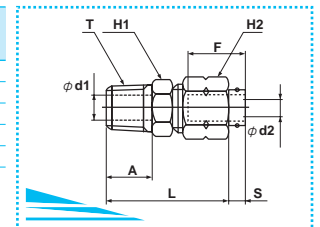
Sizes: 20m, 100m

Standard Color: ●Black



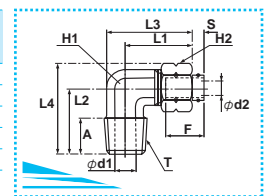
## Straight Connector

Model	Applicable Decabon Tube	T Screw size	L (mm)	A (mm)	F Tube Insertion Length (mm)	H1 Dual Surface Width (mm)	H2 Dual Surface Width (mm)	S (mm)	d1 (mm)	d2 (mm)	Weight (g)
DC6-PT1/8	1300-6	R1/8	28.0	11.0	15.0	10.0	12.0	4.5	5.0	2.7	14.5
DC6-PT1/4	1300-6	R1/4	30.0	12.0	15.0	14.0	12.0	4.5	7.0	2.7	22.0
DC10-PT1/8	1300-10	R1/8	30.0	11.0	18.0	17.0	17.0	4.5	5.0	5.6	28.0
DC10-PT1/4	1300-10	R1/4	31.0	12.0	18.0	17.0	17.0	4.5	7.0	5.6	32.0
DC10-PT3/8	1300-10	R3/8	32.0	13.0	18.0	17.0	17.0	4.5	9.0	5.6	38.0



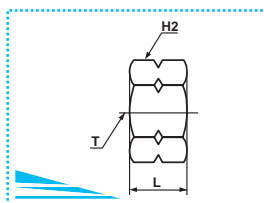
## 90° Angle Connector

Model	Applicable Decabon Tube	T Screw size	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	A (mm)	F Tube Insertion Length (mm)	H1 Dual Surface Width (mm)	H2 Dual Surface Width (mm)	S (mm)	d1 (mm)	d2 (mm)	Weight (g)
DL6-PT1/8	1300-6	R1/8	20.5	18.5	26.0	25.5	11.0	15.0	10.0	12.0	4.5	5.0	2.7	21.0
DL6-PT1/4	1300-6	R1/4	23.0	22.0	30.0	29.0	12.0	15.0	12.0	12.0	4.5	7.0	2.7	31.0
DL10-PT1/8	1300-10	R1/8	27.0	22.0	35.0	32.0	11.0	18.0	14.0	17.0	4.5	5.0	5.6	42.0
DL10-PT1/4	1300-10	R1/4	27.0	25.0	35.0	35.0	12.0	18.0	14.0	17.0	4.5	7.0	5.6	50.0
DL10-PT3/8	1300-10	R3/8	27.0	26.0	35.0	36.0	13.0	18.0	14.0	17.0	4.5	9.0	5.6	53.0



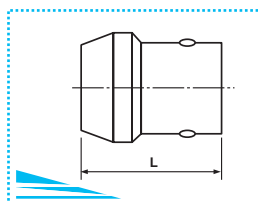
## Nut

Model	Applicable Decabon Tube	T Screw size	L (mm)	H2 (mm)	Weight (g)
N6	1300-6	M10×1	9.0	12.0	5.0
N10	1300-10	M15×1	10.0	17.0	9.0



## Nylon Sleeve

Model	Applicable Decabon Tube	L (mm)
SN6	1300-6	11.0
SN10	1300-10	12.0



## Features

Thinly corrugated stainless steel welded pipe with superior characteristics:

- Air tight
- Absorbs vibration
- High pressure capabilities
- Can be formed as needed
- High-pressure strength can be increased with the use of a stainless steel armored braid
- Manufactured in specified lengths
- Metal fittings can be silver-soldered on request

## Applications

Optical fiber protection, vacuum equipment, delivery pipe for gas, steam, oil and other fluids.



Model	ID mm (inch)	OD mm (inch)	Thickness (mm)	Bending Radius (mm)	Rep. Bend Radius (mm)	Applicable Pressure (single braid layer) (kg/cm <sup>2</sup> )	Length (mm)	Burst Pressure (single braid layer) (kg/cm <sup>2</sup> )	Standard stock
CT-8	7.2 (0.283)	11.0 (0.434)	0.25	30	100	70	5000	350	▲
CT-10	10.5 (0.413)	15.0 (0.590)	0.25	40	135	50	5000	350	▲
CT-15	13.2 (0.520)	18.5 (0.728)	0.25	50	140	45	5000	230	▲
CT-20	19.2 (0.756)	25.5 (1.000)	0.3	60	200	30	5000	200	▲
CT-25	25.0 (0.984)	32.6 (1.283)	0.35	70	230	25	5000	100	▲
CT-32	32.3 (0.127)	41.0 (1.614)	0.35	80	255	20	5000	100	▲
CT-40	38.5 (1.516)	47.5 (1.870)	0.4	90	355	15	5000	100	▲
CT-50	51.5 (2.028)	61.5 (2.421)	0.4	110	410	10	5000	65	▲
CT-65	63.5 (2.500)	76.5 (3.011)	0.4	140	420	10	5000	45	▲

※Standard stock ○=HAGITEC standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

# Micro-Flexible Annular Hose

## Features

Made from SUS316 Stainless Steel, this tube:

- Resists rusting
- Withstands pressure, high and low temperatures

Armored stainless steel braiding used in conjunction will increase this conduit's high pressure capabilities.

## Applications

For high precision mechanical equipment such as:

- Semiconductor and LCD panel manufacturing devices
- Pharmaceutical processing equipment
- Biological and food processing equipment where durability, pressure tightness and safety are required
- Optical fiber protection requiring air-tightness
- Medical devices (blood cooling in cryogenic heat exchangers)
- Delivery pipe for oil, steam, and air in vacuum equipment

## Test Data

Working pressure:

Ultra High Vacuum - max. 0.5 mPa

## Leak Allowance

Less than  $1.33 \times 10^{-10}$  Pa·m<sup>3</sup>/sec

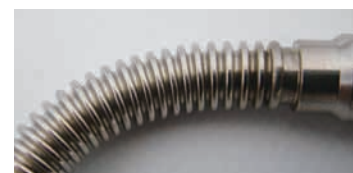
## Size of metal fittings

3.18mm, 6.35mm

as well as custom metal fittings

## Material

SUS 316L



Model	ID mm (inch)	OD mm (inch)	Approx Weight (g/m)	Standard stock
MF-3A	3.5 (0.138)	5.0 (0.197)	30	▲
MF-4.5A	4.5 (0.177)	7.0 (0.276)	65	▲
MF-6A	5.5 (0.217)	8.5 (0.335)	70	▲

※Standard stock

○=HAGITEC standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

# Screw Tube

## Features

- Excellent fluid rectification and heat exchange capabilities
- Pliable tubing
- Increased heat exchange by using ultra-conductive materials
- Manufactured to customer-specified lengths
- Can be manufactured with silver-soldered metal fittings

## Applications

- Optical fiber protection that requires air-tightness
- Cryogenic heat exchanger for artificial heart and lung devices
- Heat exchanger in water-cooled computers
- Delivery pipes for oil, steam, air and other fluids in vacuum equipment.

## Materials

Stainless Steel,  
Aluminum, Copper  
and other materials

## Size

Bore diameter

2 ~ 20 mm ID available

## Special treatments

Teflon coating, chemical  
polishing and other services  
available

This product has the best heat exchange capabilities of all our flexible tubes. Production will be scheduled after receipt of order.



Model	ID ± 0.2mm (inch)	OD ± 0.2mm (inch)	Thickness (mm)	Minimum Bending Radius ± 0.5 (mm)	Max. Working Pressure Rating (Kg/cm <sup>2</sup> )	Burst Pressure (Kg/cm <sup>2</sup> )	Maximum Length (mm)	Standard Stock
S-2	2.0 (0.079)	3.1 (0.122)	0.12	9	10	-	550 (screw/500)	▲
S-7.5	4.5 (0.177)	7.5 (0.295)	0.25	25	8	20	2000 (screw/1800)	▲
S-11	7.5 (0.295)	11.0 (0.433)	0.25	40	8	20	2000 (screw/1800)	▲
S-15	9.0 (0.354)	15.0 (0.591)	0.25	-	7	18	2000 (screw/1800)	▲
S-18	13.0 (0.512)	18.0 (0.709)	0.3	-	5	15	2000 (screw/1800)	▲

※Standard stock ○=HAGITEC standard stock item. Stock quantity will be 10 to 500m. ▲=contact us



## Features

- Suitable for shower hoses and pullout faucets
- Most durable for pulling applications

## GVWZVHcbg

- Flattened semi-interlocking design for an unlocked structure
- Thin, lightweight material
- Smooth surfaces for noise reduction
- High flexibility for easy manipulation
- Chemically polished for superior aesthetics
- Can be manufactured with a resin inner tube and joint connector, making the product one unit.

## Material

Stainless Steel

## Structure

Interlock or Square-Lock styles available

Model	ID mm (inch)	OD mm (inch)	Bending Radius (mm)
SASH-14	11.8 $\pm$ 0.2 $\phi$ (0.465)	14.0 $\pm$ 0.1 $\phi$ (0.551)	40
SASH-16	11.3 $\pm$ 0.2-0.1 $\phi$ (0.445)	16.0 $\pm$ 0.1-0.2 $\phi$ (0.630)	40



# Delivery Hose (Outlet Tube)

## Features

- No water pressure leakage, due to cotton packing thread inside of stainless interlocking tube.
- Maintains bent shape
- Direction of the spout is easily changed
- Can be cut and deburred to required lengths
- Supplied as tube only or with terminal nozzle and connector (box nut/cap nut) connected to unit.

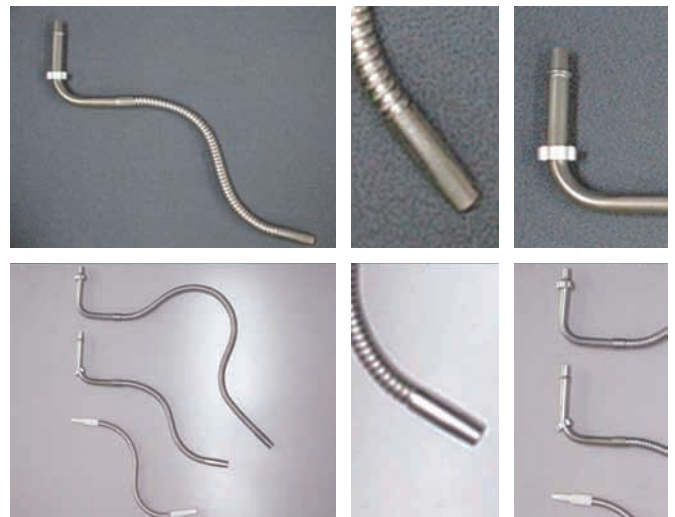
## Applications

- Gas water heaters
- Water purifiers
- Spout for water treatment equipment

## Material

Stainless steel

Model	ID $\pm$ 0.2mm (inch)	OD $\pm$ 0.2mm (inch)	Bending Radius (mm)
ISDH-10.5	8.0 (0.315)	10.5 (0.413)	40~60
ISDH-12.5	10.0 (0.394)	12.5 (0.492)	40~60
ISDH-13.5	11.0 (0.433)	13.5 (0.531)	40~60



# Applications



■ **Processing the flexible tube with a resin/rubber coating provides the following additional benefits:**

- Waterproof/resistant
- Oil-proof/resistant
- Attractive appearance
- Additional strength
- Superior electrical insulation

**The following chart displays only some of the materials available. Please consult us regarding specifications, minimum lot, delivery date and materials available (including any heat or chemical resistance required for the application).**

**Ordering Instructions:** Add material code after alphabetical model

Example: KSSi-\_\_\_N (enter inner diameter of tube before N)

- Square-Lock Type A Casing Tube with Silicone (Si) sheathing

Material type (code)	Version	Color	Resin characteristics	Surface appearance
PVC/Polyvinyl chloride (P)	Soft	●Black (standard), ●Gray, ○White, ○Ivory, ●Red, ●Blue, ●Yellow, ●Green, ●Orange, ○Clear	-Pliable -Chemical resistant -Heat resistant up to 60°C -High oil resistance	Glossy or Matte or Clear
	Soft-hard type	●Black	-Slightly hard -Smooth surface -Chemical resistant -Heat resistant up to 60°C -Oil Resistant	Glossy
	Flame resistant	●Black, ●Gray, ○White, ●Pink, ●Red, ●Blue, ●Yellow, ●Green, ●Orange	-Pliable -Chemical resistant -Heat resistant up to 60°C -High oil resistance	Glossy
	Flame resistant UL standard	●Black	-Pliable -Chemical resistant -Heat resistant up to 105°C -High oil resistance	Matte
Polyethylene (PE)	Low density (LDPE)	●Black	-Harder than soft-hard type -Smooth surface -Chemical resistant -Heat resistant up to 70°C -High oil resistance	Glossy
Polyester Elastomer (TEEE)		●Black	-Pliable -Weatherproof -Heat resistant up to 120°C	Glossy
Silicone Rubber (Si)		●Black, ●Gray	-Pliable -Heat resistant up to 180°C	Matte
Fluorocarbon Resin (FEP) (ETFE)		●Black	-Less Pliable -Excellent chemical and oil resistance -Slippery non-stick surface -Heat resistance up to 220°C	Glossy
Polyurethane (PU)	Ester grade	●Black	-Pliable -Abrasion resistant -Heat resistant up to 70°C	Glossy
	Ether grade	●Black, ○Ivory	-Pliable -Abrasion resistant -Water soluble -Heat resistant up to 70°C	Glossy
Olefin Elastomer (O)		●Black	-Pliable -Weatherproof -Heat resistant up to 60°C	Matte



## Flexible Metal Tube Materials

We can provide samples of many of our flexible conduits based on the specifications of your application. Please contact us for estimated delivery and minimum order quantities.

Material	Type	Application	Features	Applicable Tube Type
Stainless Steel	SUS304 (standard), 303, 316, 430	-General industrial -Medical	-Rigid -Doesn't rust	-Most tube types
Aluminum		-General industrial -Medical	-Doesn't rust -Anti-static -Lightweight but less sturdy -Excellent thermal conduction	-Square-Lock Type A -Interlock Type B -Screw Tube
Titanium		-General industrial -Medical -Aerospace engineering	-Rigid -Anti-static -Lighter than stainless steel	-Square-Lock Type A
Bronze phosphate	C5341	-Noise countermeasure	-Less rigid -Excellent thermal conduction	-Most tube types
Copper		-Noise countermeasure	-Less rigid -Excellent thermal conduction	-Most tube types
Brass		-Noise countermeasure	-More rigid than copper, less rigid than stainless steel -Excellent thermal conduction	-Most tube types
Steel	-Galvanized steel strip -SK material (hardened steel)	-General industrial	-Affordable price -Heavy -Prone to rusting -Generally needs to be sheathed	-Most tube types

## Other Services

Extra washing or polishing offers better quality, especially for fiber applications

### Double Washing

Double washing treatment (using detergent) can be applied to tubes for high precision applications

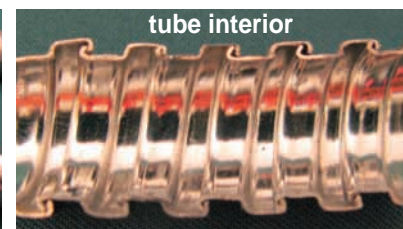
### Chemical Polishing

We offer tubes with chemical polishing, providing extra shine for optical applications

※Special polishing for semiconductor-quality applications also available.

### Spooling

We can deliver flexible tubing on plastic reels for easy handling and maintenance.



## Applications

### Applications



■ Fiber Protection connectors can be used to connect a UbmighmYg of.

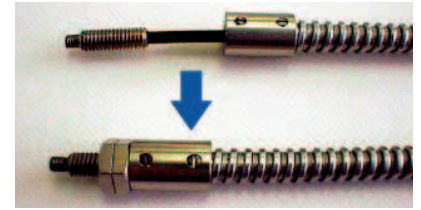
- Proximity switch^•
- Photoelectric switch^•
- Heatproof temperature sensor^•

The sensor head and cylindrical head connectors are fastened to the sensor head. The panel connector is secured onto a chassis/panel. End cap^• æ^A^•^A for terminal processing amplifier connector^• A^•{ æ^A^•^A } a^• æ^A^•} d fixed amplifier^•.

■ There are basically three ways of attaching the tubes

- Machine Screwed
- Pin Locked
- Adhesive

We also design and manufacture custom made connectors upon request.



### 1. Screw type:

Secured by pins after being screwed onto tube

■ Features

- Terminal treatment
- Prevents damage to optical fiber and cabling
- Easy assembly and removal of sensor from tube
- Resists high-heat environments

■ Applications

Sensor and cable protection in:

- Measurement devices, sensors, robotics
- automation equipment and arcade game machines

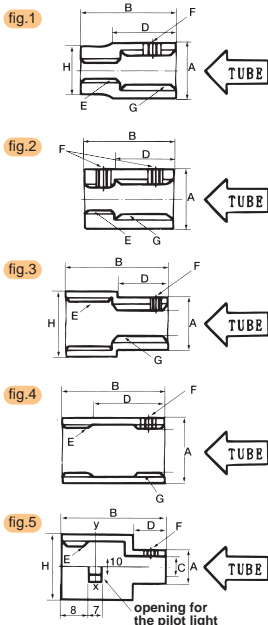
■ Note

KS8NS-M18 and KS8NS-M30 have a window for the function indicator light.

■ Material

Nickel plated on brass

Quantity: 30 pcs/pack



#### ● Sensor Head connector

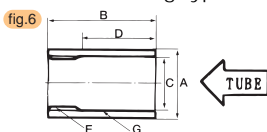
Model	φA (mm)	B (mm)	φC (mm)	D (mm)	E Sensor Unit (M x pitch)(mm)	F Set Pin (M x pitch)(mm)	φH (mm)	G Matching Tube	fig	Approx Weight (g/pc)	Standard Stock
KS3NS-M3	7	12	-	7	M3×0.5	M2×0.4	6	KS-3N · KS3.2N	1	2.1	○
KS3NS-M4	7	12	-	7	M4×0.7	M2×0.4	6	KS-3N · KS3.2N	1	2.0	○
KS3NS-M8	7	12	-	6	M8×1	M2×0.4	10	KS-3N · KS3.2N	3	2.8	○
KS4NS-M3	8	12	-	8	M3×0.5	M2×0.4	-	KS-4N	2	2.7	○
KS4NS-M4	8	12	-	8	M4×0.7	M2×0.4	-	KS-4N	2	2.5	○
KS4NS-M5	8	12	-	8	M5×0.5	M2×0.4	-	KS-4N	2	2.4	○
KS4NS-M8	8	20	-	9	M8×1	M2×0.4	10	KS-4N	3	4.6	○
KS4NS-M10	8	20	-	10	M10×1	M2×0.4	12	KS-4N	3	5.4	○
KS4NS-M14	8	20	-	10	M14×1	M2×0.4	16	KS-4N	3	8.8	○
KS4NS-M16	8	20	-	10	M16×1	M2×0.4	18	KS-4N	3	9.8	○
KS5NS-M4	9	12	-	8	M4×0.7	M2×0.4	-	KS-5N	2	3.3	○
KS5NS-M6	9	12	-	8	M6×0.75	M2×0.4	-	KS-5N	2	2.8	○
KS5NS-M8	10	15	-	10	M8×1	M2×0.4	-	KS-5N	4	4.5	○
KS5NS-M10	10	20	-	10	M10×1	M2×0.4	12	KS-5N	3	6.9	○
KS5NS-M8T	10	30	-	25	M8×1	M2×0.4	-	KS-5N	4	9.2	○
KS6NS-M12	10	20	-	10	M12×1	M2×0.4	14	KS-6N	3	6.6	○
KS7NS-M6	11	15	-	10	M6×0.75	M2×0.4	-	KS-7N	2	5.2	○
KS7NS-M12	14	31	-	26	M12×1	M2×0.4	-	KS-7N	4	13.7	○
KS8NS-M18	13	42	10.5	10	M18×1	M2×0.4	21	KS-8N	5	35.9	○
KS8NS-M30	13	43	10.5	10	M30×1.5	M2×0.4	34	KS-8N	5	84.6	○

※ Standard stock quantity will be 10 to 1000 pcs. (Depending on item)

■ Note: Screw-type sensor head connectors match Square-Lock Type A Casing Tubes. Please contact us for connectors matching other conduits.

### 2. Adhesion type:

Adhesive is applied to the tube during assembly. Can be used for interlocking-type tubes



■ Features

- Sensor head termination
- Prevents damage to optical fibers and cables
- Vibration resistant
- Cost-effective

■ Applications

- Protects sensors and cabling in:
- Measurement devices
- Sensor instruments
- Robotics and automation
- Parts in arcade game machines

■ Material

Nickel plated on brass

Quantity: 30 pcs/pack

#### ● Sensor Head connector

Model	φA (mm)	B (mm)	φC (mm)	D (mm)	E Sensor Unit (M x pitch)(mm)	G Matching Tube	fig	Approx Weight (g/pc)	Standard Stock
KS3NB-M3	6	12	5	8	M3×0.5	KS-3N · KS-3.2N	6	1.3	○
KS3NB-M4	6	12	5	8	M4×0.7	KS-3N · KS-3.2N	6	1.1	○
KS4NB-M3	7	12	5.9	8	M3×0.5	KS-4N · IS-4N	6	1.8	○
KS4NB-M4	7	12	5.9	8	M4×0.7	KS-4N · IS-4N	6	1.6	○
KS5NB-M4	8.5	12	7.3	8	M4×0.7	KS-5N · IS-5N	6	2.3	○
KS5NB-M6	8.5	12	7.3	8	M6×0.75	KS-5N · IS-5N	6	2.1	○

※ Standard stock quantity will be 10 to 1000 pcs. (Depending on item)

## Screw type

Secured by pins after screwed onto tube

### Features

- For termination of tube to sensor head
- Prevents damage to optical fibers and cabling
- Easy assembly/removal of sensor from tube
- Resists high-heat environments

### Applications

For the protection of sensors and cabling in:

- Measurement devices
- Sensor instruments
- Robotics and automation equipment
- Parts in amusement game machines

### Material

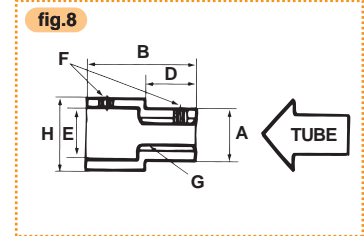
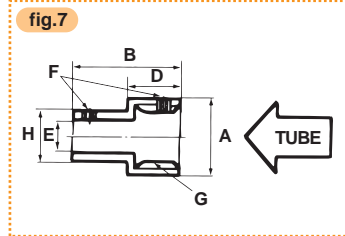
Nickel plated on brass

### Note

Please refer to column F in the chart for the type of pin.

### Pin types

- \* 1.5 mm length Standard Slotted Screw
- \* \* 2mm length Slotted Screw with a pointed tip
- \* \* \* 2.5mm length Hex Head Lag Screw



Model	φ A (mm)	B (mm)	D (mm)	φ E (mm)	F Set in (M x pitch)(mm)	φ H (mm)	G Matching Tube	fig	Weight (g/pcs)	Approx (g/pcs)	Standard Stock
KS3NS-2.8	7	17	9	2.9	M2×0.4	5	KS-3N · KS-3.2N	7	2.3	○	
KS4NS-3	8	17	9	3.1	M2×0.4	5	KS-4N	7	2.7	○	
KS4NS-3.8	8	17	9	3.9	M2×0.4	6	KS-4N	7	2.8	○	
KS4NS-5.4	8	17	9	5.5	M2×0.4	7.5	KS-4N	7	3.0	○	
KS34NS-8	8	17	9	8.1	M2×0.4	11	KS-4N	8	4.6	○	
KS4NS-9.4	8	17	9	9.5	M2×0.4	12	KS-4N	8	4.8	○	
KS5NS-5	9	12	-	5	M2×0.4	9	KS-5N	8	3.0	○	
KS6NS-5.4	11	17	8	5.5	M2×0.4	8	KS-6N	7	5.1	○	

※Standard stock quantity will be 10 to 1000 pcs. (Depending on item)

# End Cap

## 1. Screw type:

Secured by pins after End Cap is screwed onto tube.

### Features

- For termination of tube
- Prevents damage to optical fiber and cables
- Easy assembly/removal of sensor from tube
- Resists high-heat environments

### Material

Nickel plated on brass

### Applications

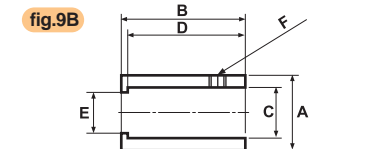
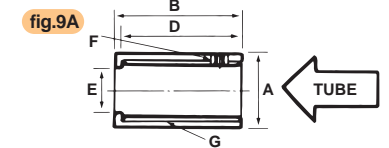
For sensor and cable protection in:

- Measurement devices
- Sensor instruments
- Robotics and automation equipment
- Parts in amusement game machines



Model	φ A (mm)	B (mm)	C (mm)	D (mm)	φ E (mm)	F Set Pin (M x pitch)(mm)	G Matching Tube	fig	Weight (g/pc)	Approx (g/pcs)	Standard Stock
KBS-1.8	5	8	3.1	7	1.8	M2×0.4	KS-1.8N	9B	-	×	
KBS-2.6	6	8	4	7	2.6	M2×0.4	KS-2.2N · KS-2.6N	9B	1.0	○	
KBS-3	7	8	-	7	3.2	M2×0.4	KS-3N · KS-3.2N	9A	1.4	○	
KBS-4	8	10	-	9	4	M2×0.4	KS-4N	9A	2.0	○	
KBS-5	9	10	-	9	5	M2×0.4	KS-5N	9A	2.3	○	
KBS-6	10	10	-	9	6	M2×0.4	KS-6N	9A	2.4	○	
KBS-7	11	10	-	9	7	M2×0.4	KS-7N	9A	2.6	○	
KBS-8	12	10	-	9	8	M2×0.4	KS-8N	9A	2.8	○	
KBS-9	15	14	-	12	9.5	M2×0.4	KS-9N	9A	6.5	○	
KBS-10	15	14	-	12	9.5	M2×0.4	KS-10N	9A	6.5	○	
KBS-11	17	14	-	12	11	M3	KS-11N	9A	9.1	○	
KBS-13	19	16	-	14	13	M3	KS-13N	9A	11.3	○	
KBS-14	20	18	-	16	14	M3	KS-14N	9A	13.3	○	
KBS-15	22	18	-	16	15.8	M3	KS-15N	9A	13.2	○	
KBS-19	26	20	-	18	19.1	M3×2P	KS-19N	9A	-	×	

※Standard stock quantity will be 10 to 1000 pcs. (Depending on item)



## 2. Adhesion type:

Adheres securely onto tube

Can be used for Interlock-style tubes

### Features

- For termination of tube
- Prevents damage to optical fibers and cabling
- Outer diameter of the cap is small
- Vibration resistant
- Economical

### Applications

For sensor and cable protection in:

- Measurement devices
- Sensor instruments
- Robotics and automation equipment
- Parts in amusement game machines

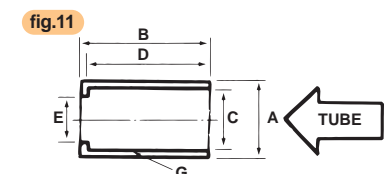
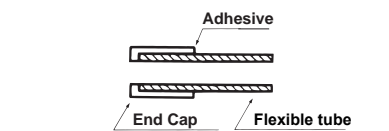
### Material

Nickel plated on brass



Model	φ A (mm)	B (mm)	φ C (mm)	D (mm)	φ E (mm)	G Matching Tube	fig	Weight (g/pcs)	Approx (g/pcs)	Standard Stock
KB-1.8	3.5	7	3.05	6	1.8	KS-1.5N · KS-1.8N	11	0.17	○	
KB-2.6	5	10	4	9	2.6	KS-2.2N · KS-2.6N	11	0.7	○	
KB-3	6	12	5	9	3.2	KS-3N · KS-3.2N	11	1.2	○	
KB-4	7	12	5.9	11	4	KS-4N · IS-4N	11	1.2	○	
KB-5	8.5	12	7.3	11	5	KS-5N · IS-5N	11	1.7	○	
KB-6	10	12	8.3	11	6	KS-6N · IS-6N	11	2.6	○	
KB-7	11	12	9.3	11	7	KS-7N · IS-7N	11	2.9	○	
KB-8	12	12	10.5	11	8	KS-8N · IS-8N	11	2.9	○	
KB-9	14	14	12.6	13	9.5	KS-9N · IS-9N	11	3.9	○	
KB-10	14.5	15	13.1	14	10	KS-10N	11	4.3	○	
KB-11	15.5	16	14.1	15	11	KS-11N	11	4.9	○	
KB-13	17	18	16	16	13	KS-13N · IS-13N	11	6.5	○	
KB-14	19	20	17	18	14	KS-14N	11	10.6	○	
KB-15	21	20	19.2	18	15.8	KS-15N · IS-15N	11	11.3	○	

※Standard stock quantity will be 10 to 1000 pcs. (Depending on item)





Secured by pins after connector is screwed onto tube.  
Interlock-style tube version also available.

## Features

- For terminating tube into a panel or box
- Prevents damage to optical fiber and cabling
- Can also be used as a panel mounting
- Easy assembly and removal from panel
- Resists high-heat environments

## Applications

- For the protection of sensors and cables in:
  - Measurement devices
  - Sensor instruments
  - Robotics and automation equipment
  - Arcade game machine components

## Material

Nickel plated on brass



fig.12

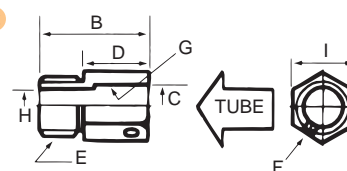
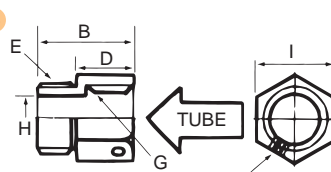


fig.13



※ "F" KPB-11-19 2-M3 (180°)

Model	B (mm)	φ C (mm)	D (mm)	E Panel screw (M x pitch) (mm)	F Set pin (M x pitch) (mm)	φ H (mm)	I (mm)	G Matching Tube	fig	Approx Weight (g/pc)	Standard Stock
KPB-1.8	14	3.1	8	M4×0.7	M2×0.4	1.8	4	KS-1.5N · KS-1.8N	12	0.75	○
KPB-2.6	14	4	8	M5×0.8	M2×0.4	2.6	5	KS-2.2N · KS-2.6N	12	2.5	○
KPB-3	14	-	8	M5×0.8	M2×0.4	3.2	6.5	KS-3N · KS-3.2N	13	2.5	○
KPB-4	14	-	8	M6×1	M2×0.4	4	8	KS-4N	13	3.6	○
KPB-5	14	-	8	M8×0.75	M2×0.4	5	9	KS-5N	13	6.4	○
KPB-6	18	-	10	M8×0.75	M2×0.4	6.1	10	KS-6N	13	14.5	○
KPB-7	18	-	10	M10×1	M2×0.4	7	12	KS-7N	13	15.2	○
KPB-8	17	-	9	M12×1	M2×0.4	8	13	KS-8N	13	9.1	○
KPB-9	20	-	12	M14×1	M2×0.4	9.5	17	KS-9N	13	19.1	○
KPB-10	20	-	12	M14×1	M2×0.4	9.5	17	KS-10N	13	19.1	○
KPB-11	23	-	14	M16×1	M3×2P	11	19	KS-11N	13	24.8	○
KPB-13	26	-	15	PF1/2	M3×2P	13	23	KS-13N	13	46.8	○
KPB-14	26	-	15	PF1/2	M3×2P	14	23	KS-14N	13	39.4	○
KPB-15	27	-	16	PF1/2	M3×2P	15.8	24	KS-15N	13	36.9	○
KPB-19	33	-	18	PF3/4	M3×2P	19	29	KS-19N	13	-	×

※Standard stock quantity will be 10 to 1000 pcs. (Depending on item)

## For Interlocked Tube

Model	B (mm)	D (mm)	E Panel screw (M x pitch) (mm)	F Set pin (M x pitch) (mm)	φ H (mm)	I (mm)	G Matching Tube	fig	Approx Weight (g/pc)	Standard Stock
IPB-4	14	8	M6×1	M2×0.4	4	9	IS-4N	12	-	×
IPB-5	14	8	M8×0.75	M2×0.4	5	10	IS-5N	12	-	×
IPB-8	17	9	M12×1	M2×0.4	8	13	IS-8N	13	-	×
IPB-9	20	12	M14×1	M2×0.4	9.9	17	IS-9N	13	-	×

※Standard stock quantity will be 10 to 1000 pcs. (Depending on item)

# Locknut for Panel Connector

## Materials

Zinc chromate plated on steel

## PF1/2 and PF 3/4

Plated steel (cold-rolled)

Model	A (mm)	B (mm)	C (mm)	Matching Panel Connector	fig
M4×0.7	3.2	7	8.1	KPB-1.8	14
M5×0.8	3.2	8	9.2	KPB-2.6 · KPB-3	14
M6×1	2.2	8	9	KPB-4	14
M8×0.75	2	11	12.7	KPB-5 · KPB-6	14
M10×1	2	14	16	KPB-7	14
M12×1	2	14	16	KPB-8	14
M14×1	2.5	17	19.6	KPB-9 · KPB-10	14
M16×1	2.5	19	21.5	KPB-11	14
PF1/2	4	-	28.5	KPB-13-15	15
PF3/4	3.8	-	33	KPB-19	15

fig.14

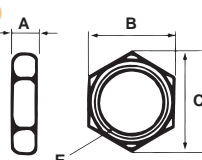
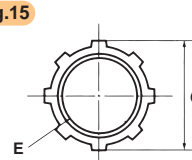


fig.15



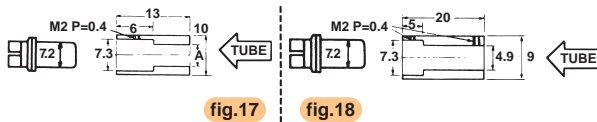
## Features

- The sensor head is completely protected by the amplifier unit.  
(Fits terminal fittings with OD 7.2mm on the sensor unit)
- Reflective type
- Transmission type

## Material

Nickel plated on brass

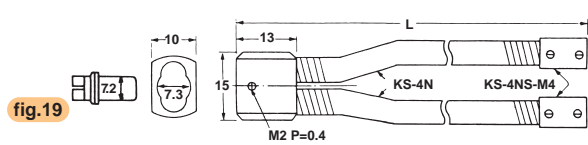
### For Reflective Type



Model	φ A (mm)	Matching Tube	fig
KAB-3	-	KS-3N · KS-3.2N	8
KAB-4	5.9	KS-4N	7
KAB-5	7.3	KS-5N	7

Pack : 20 pcs each

### For Transmission Type



Model	Matching Tube	fig
KAWB-4	KS-4N	19

Pack : 10 pcs each

# Insert

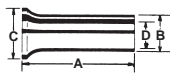
### Adhesion Type: Vonded inglXY tube

## Features

- Tube tailing
- Mounted inside of tube for protection of optical fiber and cabling from damage.

## Materials

- Tin-plated Steel
- KIN-6 is Stainless Steel
- KIN-9 is Galvanized Steel



## Note

1. KIN-13 ~75 are also available.  
Please contact us. (Material: Galvanized Steel)
2. Can be used for KSP and other types.
3. Cannot be used with End Cap or Panel Connector.

Model	A (mm)	φ B (mm)	φ C (mm)	φ D (mm)	Matching tube
KIN-1.5	6.0	1.3	2.1	1.0	KS-1.5N
KIN-1.8	6.0	1.7	2.5	1.4	KS-1.8N
KIN-2.2	7.0	2.0	2.8	1.7	KS-2.2N
KIN-2.6	10.6	2.6	3.8	2.2	KS-2.6N
KIN-3.2	9.0	3.2	4.0	2.8	KS-3.2N
KIN-4	12.0	3.9	4.7	3.5	KS-4N
KIN-5	15.5	5.0	6.8	4.6	KS-5N
KIN-6	10.0	5.9	8.2	5.3	KS-6N
KIN-7	12.0	6.3	7.5	5.9	KS-7N
KIN-8	20.0	7.9	10.6	7.3	KS-8N
KIN-9	20.0	9.5	11.8	8.5	KS-9N

Pack : 50 pcs each

### Screw Type:

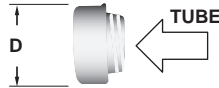
#### Screw fastener used to secure the tube

## Materials

- Cold-rolled Steel
- 66 Nylon Resin

## Note

Please indicate the material required when placing order.



Model	φ D (mm)	Matching tube
MAS-10IN	17.8	KS-10N · KSP-10N
MAS-12IN	20.3	KS-13N · KSP-13N
MAS-16IN	23.6	KS-15N · KSP-15N
MAS-22IN	29.0	KS-22N · KSP-22N
MAS-28IN	35.7	KS-28N · KSP-28N
MAS-36IN	44.8	KS-36N · KSP-36N

Pack : 20 pcs each

### Type I: Panel Connector with Box Nut

#### Product Name: MAS Connector

## Feature

- Prevents connector from slipping off  
(Use with screw-type Insert & Holder)

## Protection Grade

Over IP55F on Galvanized Zinc & Nylon

## Materials

Galvanized Zinc  
(45° type available in Brass only)  
Plastic: 66 Nylon Resin (Black)

## Note

1. When applying, make the outer diameter thicker by taping as shown in the above figure and align the polyethylene holder.
2. KSP conduits are waterproof, therefore taping is unnecessary.



### Type II: Panel Connector with Box Nut

#### Product Names: Skin Top / Skin Top MS / Skin Top Spiral

## Features

- For connecting a flexible conduit onto a panel
- For KSP conduit, it will be completely waterproof  
(Waterproof grade: IP-68)

## Material

Plastic or Metal

## Note

Please select by the tube outer diameter size needed for fitting into the clamp.  
Please contact us for product details and sizes.

Straight Connector		45° Angle Connector		90° Angle Connector		Screw size	A (mm)	B (mm)	Matching Tube
Galvanized Zinc	66 Nylon	Brass	66 Nylon	Galvanized Zinc	66 Nylon				
MAS-SG10Z	MAS-SG10N	MAS-HAG10	MAS-HAG10N	MAS-AG10Z	MAS-AG10N	G16	20.9	15.2	KS-10N · KSP-10N
MAS-SG12Z	MAS-SG12N	MAS-HAG12	MAS-HAG12N	MAS-AG12Z	MAS-AG12N	G16	20.9	17.7	KS-13N · KSP-13N
MAS-SG16Z	MAS-SG16N	MAS-HAG16	MAS-HAG16N	MAS-AG16Z	MAS-AG16N	G16	20.9	21	KS-15N · KSP-15N
MAS-SG22Z	MAS-SG22N	MAS-HAG22	MAS-HAG22N	MAS-AG22Z	MAS-AG22N	G22	26.4	26.5	KS-22N · KSP-22N
MAS-SG28Z	MAS-SG28N	MAS-HAG28	MAS-HAG28N	MAS-AG28Z	MAS-AG28N	G28	33.2	33	KS-28N · KSP-28N
MAS-SG36Z	MAS-SG36N	MAS-HAG36	-	MAS-AG36Z	MAS-AG36N	G36	41.9	42	KS-36N · KSP-36N

## ■ Feature

Used for anchoring tube/conduit (holds down both tube and End Cap)

## ■ Material

Polished steel plating

Pack : 100 pcs each

Model	A (mm)	B (mm)	C (mm)	φ D (mm)	Matching Tube
PZ0104	4	15.8	10	4.5	KS-2.2N · KS-2.6N
PZ0106	6	17.8	10	4.5	KS-3N · 3.2N · KS-4N
PZ0108	8	23.0	12	5.5	KS-5N · KS-6N
PZ0110	10	25.0	12	5.5	KS-7N · KS-8N
PZ0112	12	27.0	14	5.5	KS-9N
PZ0114	14	32.7	16	5.5	KS-10N
PZ0115	15	33.7	16	7.5	KS-11N
PZ0116	16	34.9	18	7.5	KS-13N
PZ0118	18	41.4	20	9.0	KS-14N
PZ0120	20	43.4	20	9.0	KS-15N
PZ1122	22	66.0	25	9.0	-
PZ1125	25	70.0	25	9.0	KS-22N
PZ1128	28	78.0	30	10.0	-
PZ1130	30	80.0	30	10.0	KS-25N

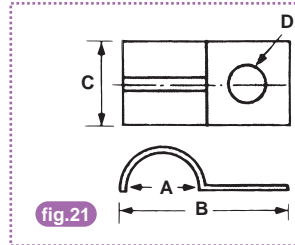


fig.21

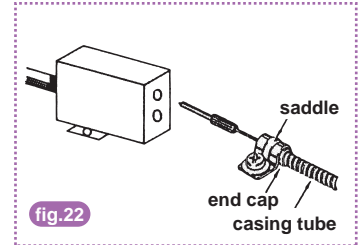


fig.22

## ■ Note

1. Apply tape to the tube to make larger diameter if too loose
2. Select saddle with dimension (A) larger than the OD of required tube
3. Also available in stainless steel

## Slotted Screw Driver

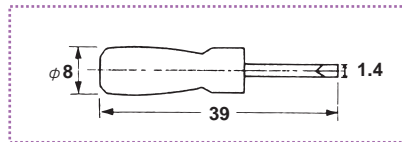
HAGI TUBE

## ■ Feature

For use with M2 screws

## ■ Model

D-M2



## Hex Key Wrench

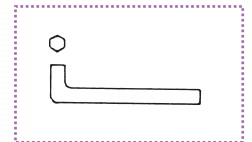
HAGI TUBE

## ■ Feature

For use with M2 hex-head lag screws

## ■ Model

D6-M2



## Set Pin

HAGI TUBE

## ■ Feature

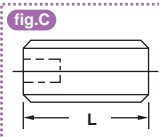
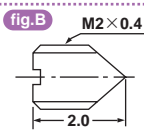
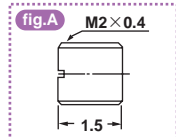
For fastening to sensor head, End Cap or Panel Connector

## ■ Material

Raw steel + Stainless Steel Plating

## ■ Note

Screw size selected based on screw-type Sensor Head Connector chart on Page 15, Column F



Model	Screw Head Type	fig
M2 × 1.5L	Slotted	A
M2 × 2L	Slotted	B
M2 × 2.5L	Hex Head Lag	C
M2 × 4L	Hex Head Lag	C
M2 × 3L	Hex Head Lag	C

## Adhesive

HAGI TUBE

## ■ Feature

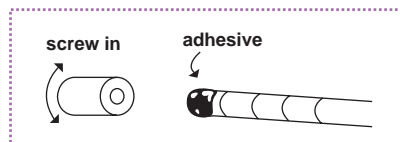
Adhesive used to attach connector to the tube/conduit

## ■ Material

High Super-5

## ■ Note

1. Apply adequate adhesive onto tube and screw on the connector.
2. Allow at least 5 minutes for the glue to harden before using.
3. Does not adhere to polyethylene, polypropylene, nylon, polyvinyl chloride (PVC), fluorocarbon resin, or rubber.



## Fiber Protector Cutting Tool

## ■ Feature

For cutting tubes

## ■ Model

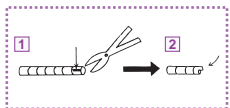
HG-175

## ■ Material

Steel Alloy

## ■ Note

1. Hold the cutter at a 90° angle to the tube and cut one pitch width (3~4mm).
2. Trim around the circumference of the tube as shown in fig 2.



## Fiber Protector Electric Cutting Tool

## ■ Feature

- The tube is cut straight and clean.
- Maximum cutting diameter 15.8 mm
- Comes with 5 extra blades

## ■ Model

S-2







## Usage

Sensor protection tubes of various lengths.

## Connector

### Screw-type benefits:

- Easy to screw on and off as needed.
- Use for high temperature

### Adhesive-type benefits:

- Outer diameter of connector is small
- Vibration resistance

## How to select

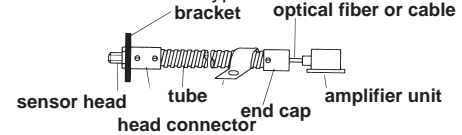
1. Select head connector according to configuration of sensor unit (screw size x pitch, cylindrical outer diameter) and outer diameter of the optical fiber and cable.
2. Refer to the appropriate instruction example and pick the terminal fitting.
3. Choose the tube (select a tube diameter larger than fiber diameter).

## Note

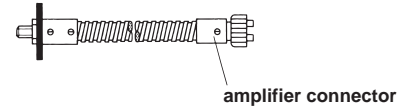
Please contact us with the model and type of sensor you want to use if you would like assistance with the selection. We will be happy to assist you. Also contact us if you cannot find the correct connector for your sensor head configuration or require a customized solution.

(Refer to the diagrams below for proper mounting instructions)

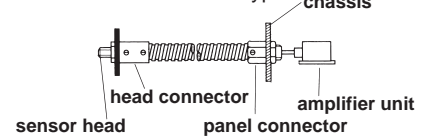
### A: Saddle-anchored type



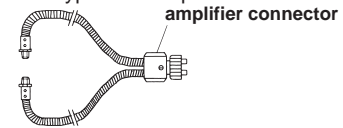
### B: Reflective type with Amplifier



### C: Fixed Panel Connector type



### D: Transmission type with Amplifier



# How to order



## 1. When assembling at our factory:

The tube will be cut into specified length, de-burred and assembled.  
Minimum lot: 1 pc.  
(L=500mm and 1000mm are standard lengths.  
Custom lengths available upon request)

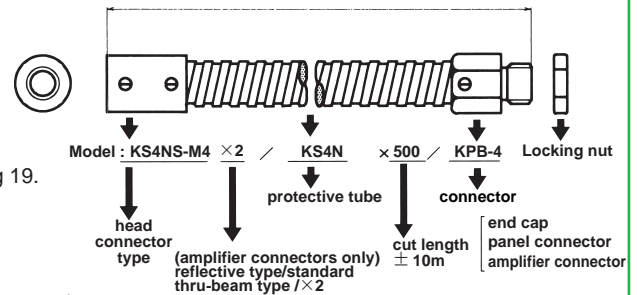
## Note

### Regarding Transmission-type Applications:

- KAWB-4 will be attached according to configuration on page 18, fig 19.
- Other transmission types come in sets of two per order.

### Regarding Adhesion-type Applications:

Heat tolerances: -40 ~ +100°C on finished product.  
Adhesive: High Super 5 in this catalog (should be applied at room temperature).



## 2. Assembly by users:

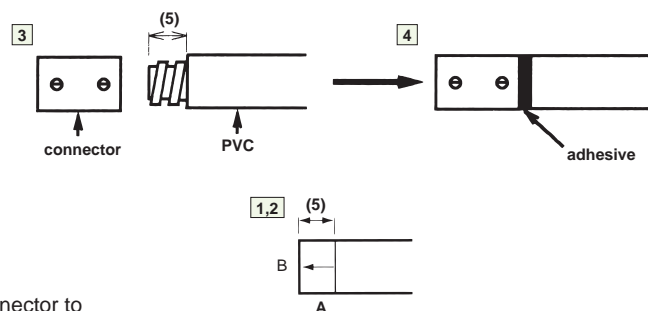
Please separately order Tube and Connector.  
Minimum order lot for tube: 10m  
Minimum order for connector: 1

## Note

How to put the connector onto KSP-type tubes:

1. Using a knife, cut PVC 5mm (A) from the edge of the tube.
2. Slit tube, starting at (A) and ending at (B).
3. Peel off the PVC from the tube termination.
4. Screw the connector onto tube.

Apply small amounts of adhesive between tube and screw connector to enhance strength.





*We can manufacture a wide variety of resin and rubber tubes upon request to customer specifications.*

### ■ Size

0.03mm up to 25.4mm, in increments of 0.1mm

### ■ Applications

- Optical fiber protection
- Electrical applications
- Air and fluid delivery systems
- Semiconductor equipment
- Chemical analysis and other laboratory applications



Material Type (Code)	Grade	Minimum Inner Diameter	Features	Temperature Range	Applications	Natural color (Available colors)
Polyvinyl chloride (PVC)	Soft	0.5mm ~	Pliable	-20~80°C	Optic fiber protection	Clear, Black (Others)
	Hard	0.4mm ~	Most general-purpose resin	-20~80°C	Machine tools	
	Flame resistant	0.5mm ~	Chemical resistant	-20~105°C	Medical devices	
Polyester Elastomer (PETP)		0.2mm~	Greater heat resistance Durable Flame resistant	-50~150°C	Optic fiber protection and similar applications	Opal (11 other colors)
Fluorocarbon resin	PTFE	0.051mm~	Heat resistant Chemical resistant	-65~288°C	Medical, semiconductor, physics & chemistry lab equipment	Opal (Contact us for other colors.)
	PFA	0.1mm~	Heat resistant Chemical resistant Gas impermeable, high clarity	-65~260°C	Medical, semiconductor, physics & chemistry lab equipment	Translucent (Green, Yellow, Blue, Red, etc)
	FEP	0.3mm~	Heat & chemical resistant Higher clarity than PFA Gas impermeable	-65~200°C	Medical, semiconductor, physics & chemistry lab equipment	Translucent (Green, Yellow, Blue, Red, etc)
	ETFE	0.3mm~	Heat resistant Chemical resistant Gas impermeable	-100~150°	Medical, semiconductor, physics & chemistry lab equipment	Translucent
	PVDF	0.3mm~	Heat & chemical resistant Highly gas impermeable	-65~150°C	Medical devices Physics & chemistry lab equipment	Translucent
	THV200	0.5mm~	Most pliable fluorine type	-20~80°C	Machine tools	Clear (Black)
	THV400		Optimum fluid transfer and high clarity	-20~110°C	Laboratory equipment	
	THV500			-20~150°C	Medical devices	
Polyurethane (TPU)	Ester	0.5mm~	Pliable & resilient	-40~88°C	Machine tools	Clear, Black (Contact us for other colors)
	Ether		Abrasion resistant		Laboratory equipment	
	Caproate				Medical devices	
Polyamide/Nylon (PA)	6 PA	0.35mm~	Superior resistance to alkaline substances	-40~100°C	Optic fiber protection Machine tools Medical devices	Opal (Contact us for other colors)
	66 PA		Weak acid resistance			Opal (Contact us for other colors)
	11 PA		Weatherproof			Opal (Contact us for other colors)
	12 PA		Slippery surface but high moisture absorption			Opal (Contact us for other colors)
Polyethylene (PE)	Low density (LDPE)	0.3mm~	High chemical resistance Slippery surface	-30~80°C	Medical devices	Opal (Contact us for other colors)
	High density (HDPE)			-50~100°C	Physics & chemistry lab equipment	
Polypropylene (PP)		0.3mm~	High chemical resistance Slippery surface	-5~110°C	Medical devices Physics & chemistry lab equipment	Opal (Contact us for other colors)
Polyetherether ketone (PEEK)		0.03mm~	Radiation and heat resistance Slippery surface Does not protect against strong acids	-50~260°C	Machine tools Optic fiber protection Medical devices	Grayish brown
Other materials with which we have experience:	Polyether sulfone (PES), Polyamide-imide (PAI), Polyphenylene sulfide (PPS), Polycarbonate (PC), ABS, Acrylic (PMMA), Polyacetal (POM), Poly-butylene terephthalate (PBT) and etc.					





Production will be scheduled after receiving order.

## 1. For Endoscope Manipulation (Spring Tube)

### ■Application

The flexible tube is used to manipulate the lens angle during insertion of endoscopes.

### ■Minimum Size

Inner diameter: ~ 0.6 mm

### ■Outer diameter

~ 1.4 mm

### ■Material

Stainless steel



## 2. For Endoscope Housing (GHY!BraidYX Mono-coil)

### ■Minimum Size

Inner diameter: please inquire

### ■Outer diameter

Please inquire

### ■Material

Stainless steel



## 3. For Endoscope Optical Fiber Protection (Mono-coil)

### ■Application

For the protection and guidance of optical fiber used in endoscopes

### ■Minimum Size

Inner diameter: d  $\leq$  1mm

### ■Outer diameter

~ 0.15 mm

### ■Material

Stainless steel



## 4. For Catheter Protection (Spring Tube - Extra!fine S-coil)

### ■Application

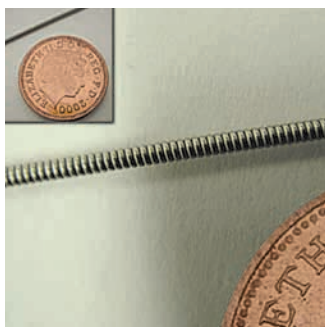
As a guide tube for variable catheters

### ■Minimum Size

~ 0.1 mm

### ■Material

Stainless steel



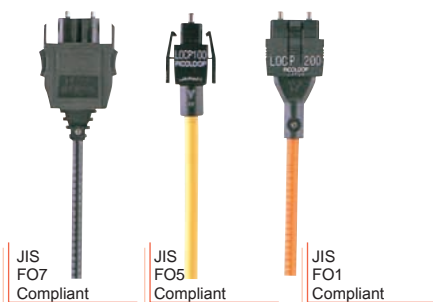


**'PICOLOOP'...Optical fiber protected in a metal tube...adding a new dimension to network security.**  
Lighter, smaller and more cost-effective - just as easy to install as electronic circuits.



SC JIS FO4 Compliant

High tensile strength gives PICOLOOP great protection from pulling, side pressure and repeated disconnection. Eight color variations available.



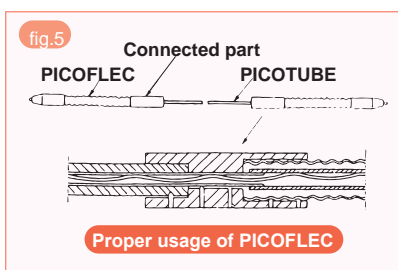
JIS FO7 Compliant

JIS FO5 Compliant

JIS FO1 Compliant



MPC-type PICOCABLE



Proper usage of PICOFLEC



With PICOLOOP, networks can be wired in much the same way as regular electronic cable, without requiring the careful handling typically required with conventional optical fiber systems.

PICOFLEC is a version of PICOLOOP composed of a highly flexible metal tube with heavy-duty optical connectors to match. It can be supplied with an assortment of connectors to meet specific needs.

PICOCABLE is supplied in continuous semi-seamless tubing and is suitable for long distance communication applications. It can be supplied in lengths of up to several kilometers without interconnects.

PICOLOOP fiber cables and accessories are designed for top performance, reliability and easy installation for a wide range of applications.

'PICOSENSOR' is a heat-resistant optical fiber in a semi-seamless metal tube, and is capable of resisting temperatures as high as 300°C. It is currently being used in a diverse range of high-tech temperature-sensing applications.

## ◎Features of PICOLOOP

### 1. PICOFLEC

- ① Optical fiber cable is inserted into a protective flexible stainless steel tube and then covered by a sheath of fire-retardant PVC.
- ② Any single or combination of strands can be inserted into a PICOFLEC. Examples include: GI, SM, DSF, MGF, PCF, HPCF, APF, fiber ribbon.
- ③ The RAINBOW SERIES of PICOFLEC is available for color coding purposes. These are supplied in eight individual colors : ● red, ● orange, ● yellow, ● green, ● blue, ● white, ● grey and ● black.
- ④ Several types of heavy-duty optical connectors strengthened by protective sleeves can be supplied. These prevent the fiber from breaking at the termination. Connectors conform to JIS F01, JIS F04, JIS F05, JIS F07, and JIS F08
- ⑤ Cables and connectors with up to eight strands are available as standard items.
- ⑥ Lengths larger than 500 meters can be supplied.
- ⑦ These cables can protect optical fibers from animal damage such that caused by rats and other small animals.

### 2. PICOCABLE

- ① PICOCABLE is available in any material, wall thickness or diameter specified by the client. Typical selections are stainless steel, Incoloy, Inconel, nickel, copper, titanium and aluminum.
- ② Any combination of optical fiber and number of strands can be inserted, including: GI, SM, DSF, MGF, PCF, HPCF, APF, fiber ribbon.
- ③ Various types of cable configurations are available to meet installation requirements, for example: FPC, KPC, and SS MPC types.
- ④ PICOCABLE's armored construction enables it to be installed in difficult locations at a remarkably lower cost than conventional fiber cable.
- ⑤ No special expertise is necessary for installation. It can be installed in much the same way as ordinary electronic cable.
- ⑥ Special tools can be provided for cutting the semi-seamless metal tube.

### 3. PICOSENSOR

Optical fiber temperature sensor systems have been developed that have a wide operating range, and can be supplied for the needs of many industries.

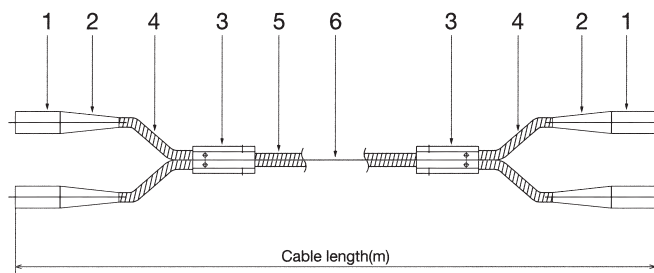
Metal tube availability: Stainless steel, Incoloy, Inconel, nickel, copper, titanium, aluminum.

Applicable temperature range: -196°C to 300°C.



PICOLOOP fiber and connectors used in combination provide a complete solution and best possible attention to side pressure, tensile and bending strength. The use of thin branching tubes means it can be installed with a minimum of space and a high mounting density anytime.

- 1) Optical Connector
- 2) Cord bushing
- 3) Splitter
- 4) Branching tube (PICOFLEC)
- 5) Main flexible tube (PICOFLEC)
- 6) Optical Fiber



## Standard Ordering Code

PLJ

Number of connectors per end		Connector specification		Optical fiber specification			Optical fiber polishing specification		Main flexible tube type		Flexible tube color		Cable length
Type	Code	Type	Designation	Code			Type	Code	Type	Code	Type	Code	Length (unit: m)
FC	FC	GI	50/125	G1			PC	P	KSP-1.8N	18	Black	B	<div></div> <div></div> <div></div> <div></div>
SC	SC		80/125*	G2			Flat	H	KSP-2.6N	26	Green	G	
DSC	DSC		200/250*	G3			APC(8°)	AC	KSP-3N	30	Yellow	Y	
ST	ST		400/500*	G4			SPC	SP	KSP-4N	40	Blue	S	
DP	DP		62.5/125	G5			AdPC	Ad	KSP-6N	60	Orange	D	
DL	DL	SM	10/125	S1							Red	R	
CF2001	21		8/125	S2							White	H	
CF1001	11										Gray	N	
FDDI	MA	MGF	200/250	M1							Right green	K	
FDDI	MB	HPCF	200/230	H1							Pink	P	
FDDI	MM		200/250	H2									
FDDI	MS												
LC	LC												
DLC	DLC												

(\*customized product)

※MF10 are also available

[Product Ordering Example]

2 single mode fibers, SC connectors, Main flexible KS-2.6N yellow, L=10m

PLJ2/2SCS1P26Y0010

## PICOFLEC technical information

Flexible tube specification sheet (unit: mm)

Symbol	KSP-1.8N	KSP-2.6N	KSP-3.0N	KSP-4.0N	KSP-6N
Material	SUS304BA PVC sheath				
Inner diameter	1.8±0.2	2.6±0.2	3.0±0.2	4.0±0.2	6.0±0.2
Outer diameter	2.9±0.2	3.8±0.2	4.6±0.2	5.6±0.2	8.1±0.2
Minimum bending radius	R=40±5	R=40±5	R=40±5	R=40±5	R=40±5
Sheath outer diameter	3.5±0.2	4.8±0.2	6.0±0.2	7.0±0.2	10.0±0.2

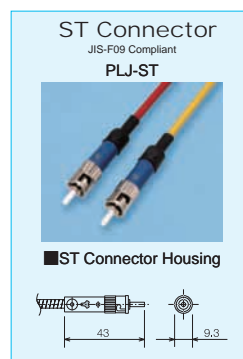
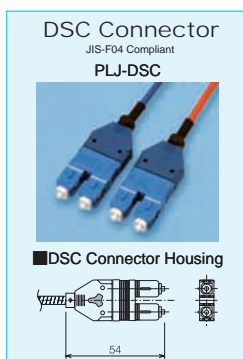
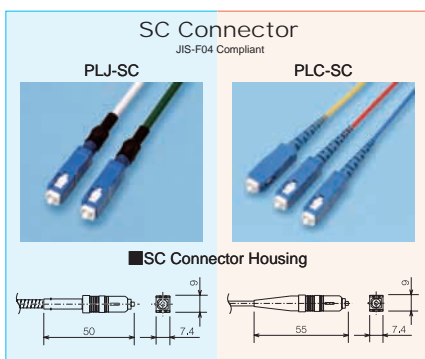
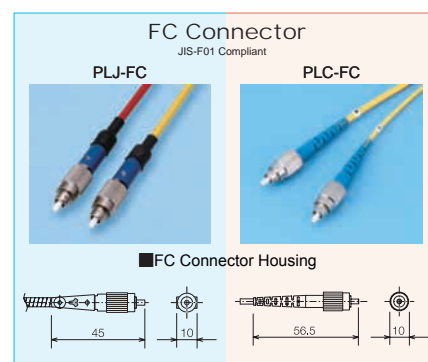
Cable length tolerance

	Length	Tolerance
Cable length	Less than 10m	+200-0 (mm)
	10m or more	+5-0 (%)
Branching tube length	Less than 10m	+100-0 (mm)
	10m or more	+5-0 (%)

## Connector Polishing Specification Table

Optical fiber	SM10/125					GI 50/125, GI 62.5/125			PCF200/300		PCF200/300	
	Flat	PC	SPC	AdPC	APC	Flat	PC	SPC	Flat	Flat	Flat	Flat
PLJ Type	FC	O	O	O	O	O	O	O	O	O	O	O
	SC	O	O	O	O	O	O	O	O	O	O	O
	DSC	O	O	O	O	O	O	O	O	O	O	O
	ST	O	O	O	O	O	O	O	O	O	O	O
	FDDI	O	O	O	O	O	O	O	O	O	O	O
	LOCP200								O			
	CF-2001H									O		
PLC Type	DL72ME										O	
	DP	O	O	O	O	O	O	O	O	O	O	O
	LC	O	O	O	△	O	O	O	O	O	O	O
	FC	O	O	O	O	O	O	O	O	O	O	O
	SC	O	O	O	O	O	O	O	O	O	O	O
	DSC	O	O	O	O	O	O	O	O	O	O	O
	ST	O	O	O	O	O	O	O	O	O	O	O
Insertion loss (db)	1.0≥	0.5≥	0.5≥	0.5≥	0.5≥	1.0≥	0.3≥	0.5≥	2.5≥	2.5≥	2.5≥	2.5≥
Reflection loss (db)		25≤	40≤	40≤	60≤		22≤	35≤				

△Please inquire.









PICODRUM is a newly-developed hybrid product reflecting our customers' requests for optical fiber that's as easy to connect as electric wire extension cables.



StandUrdr model

Disconnection- and emergency-free optical fiber even under electrical extension wire handling type situations. The PICODRUM is designed for the short-term or short distance connection of optical fibers.

## Features of PICODRUM

● Easy portability due to the integration of the PICOCABLE and the PICOFLEC into the PICODRUM, eliminating many construction site restrictions.



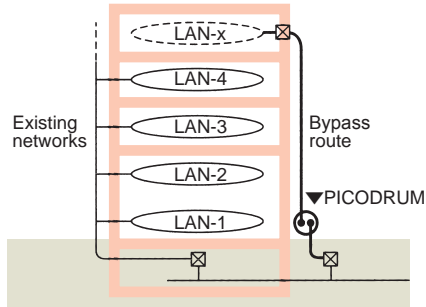
Waterproof model

● The combined use of one or more PICODRUMs expands and widens the optical fiber connection area.

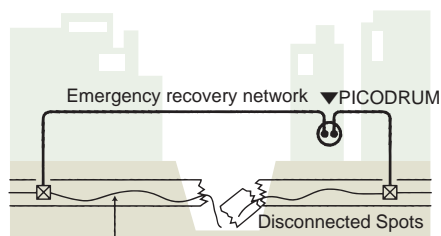
● Designed to be lightweight, at 10kg, the PICODRUM offers fail-safe and highly efficient installation at elevated or unstable locations.

● The WP type makes it possible to use optical cable outside, even on a rainy day, due to its IP67 design.

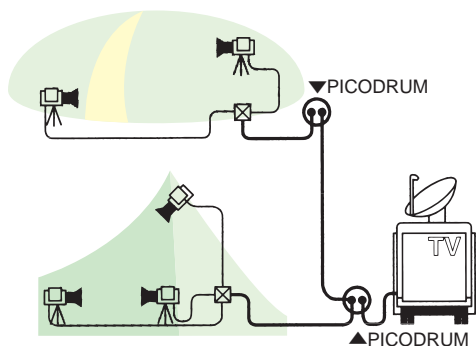
## Typical PICODRUM Application



Ex.1 Preliminary LAN Network Bypass Routing



Ex.2 Public Communication Line Emergency Recovery



Ex.3 Outdoor Relay Broadcast Network

## Specification table

Model	PICODRUM (Standard Model)		PICODRUM WP (Waterproof Model)	
	PDMS14-120	PDMG14-120	PDMWPS12-150 -MFR/MFP	PDMWPG12-150 -MFR/MFP
Cable Length (m)	120 (up to 150m)	120 (up to 150m)	150	150
Fiber Type	SM 10/125	GI 50/125	SM 10/125	GI 50/125
Number of optical fibers	4	4	2	2
Connector type	SC/FC/ST	SC/FC/ST	MF10	MF10
Physical dimensions (mm)	315 x D165	315 x D165	315 x D165	315 x D165
Net Weight (Kg)	Approx. 10	Approx. 10	Approx. 8	Approx. 8
Main Cable Tensile Strength (N)	Approx. 500	Approx. 500	Approx. 460	Approx. 460
Main Cable OD (mm) (Olefin Elastomer Sheath)	Approx. 6.8	Approx. 6.8	Approx. 5.5	Approx. 5.5

※ Built-in E/O converter type also available. Please inquire.

※ 420mm diameter reel also available with cable lengths up to 300m.

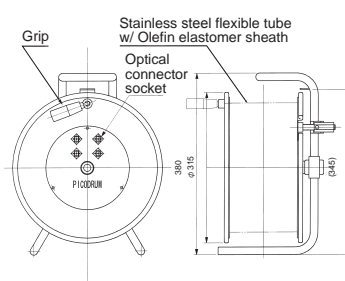
## Options

SC-ST Short Jumper  
SC-FC Short Jumper

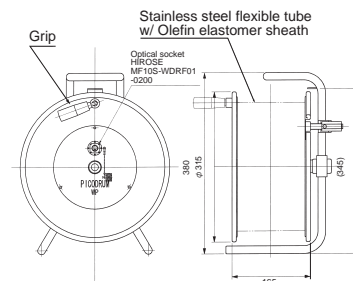
The SC type is the standard version for drum insertion connectors. Short jumpers other than the SC type are also available.

FC-MFP Short Jumper  
FC-MFR Short Jumper  
SC-MFP Short Jumper  
SC-MFR Short Jumper

The MF10 type is the standard version for drum insertion connectors. Short jumpers other than the MF10 type are also available. Non-FC and non-SC types also available.



PICODRUM (Standard Model)

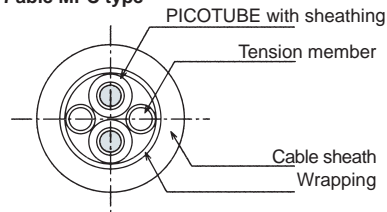


PICODRUM (Waterproof Model)

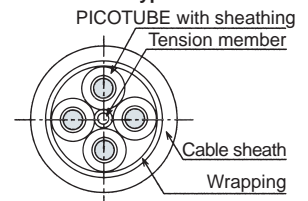
The PICOCABLE is a thin, lightweight cable which houses optical fibers in a seamless metallic tube. Easy to handle and as strong as corrugated cable, the PICOCABLE provides environmental freedom and minimizes total installation costs.

### Optical fiber insertion specifications

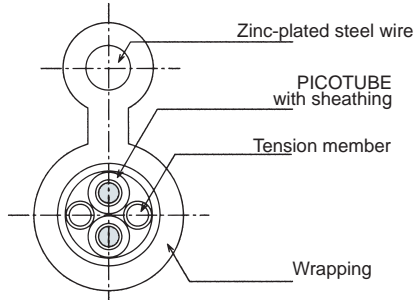
#### 2-7 able MPC type



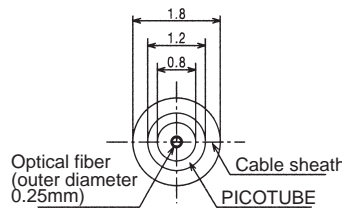
#### 4-7 able MPC type



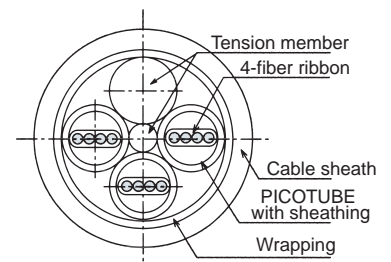
#### 2-7 able SS MPC type



#### 1-iber SPC type (sizes are 2-f reference only)



#### 3-7 able 12-fiber MPC type



Note: For other types, please contact our sales office

### Code Table PL

Cable sheath		Cable configuration		Optical fiber specification			Q'ty of tubes		Q'ty of fibers		Cable length	
Type	Code	Type	Code	Type	Designation	Code	Q'ty of tubes		Q'ty of fibers		Length (unit: m)	
PVC	V	SPC	SP	GI	50 / 125	G1	1		1	1	Examples:	
PE	E	SSMPC	SS	SM	62.5 / 125	G5	2		2	2		
		MPC	MP	HPCF	10 / 125	S1	3		1	1		
					8 / 125	S2	4		2	2		
					200 / 230	H1	6		1	1		
					200 / 250*	H2	8		2	2		
				MGF	200 / 250	M1			4	2		

[Product Ordering Example]  
2-Cable MPC type  
PL-E-MP-S1-2-12-2000

(\*Custom product)

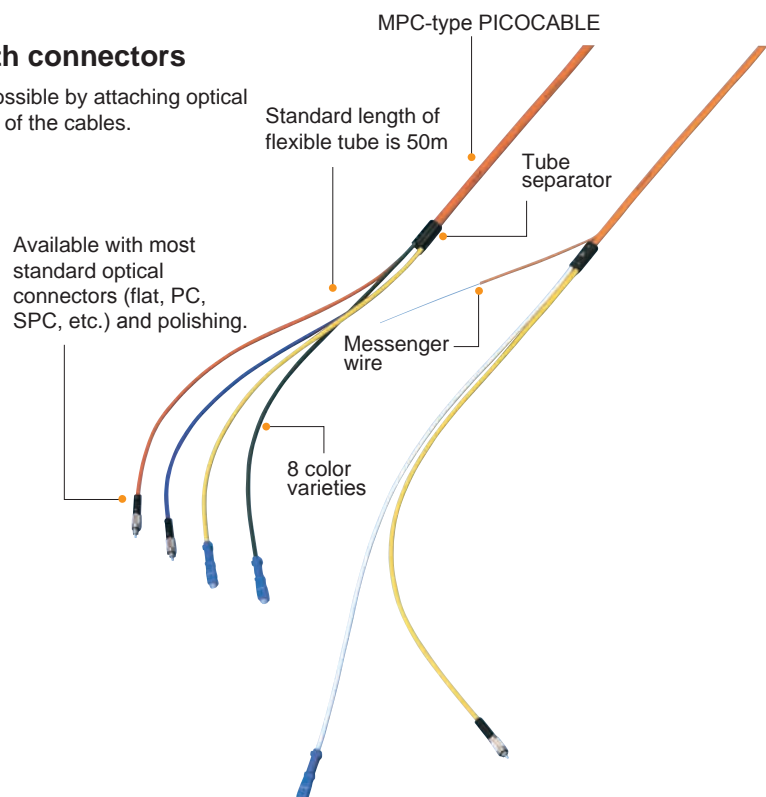


### PICOCABLE: Yuh fYg

- Complete linecard of metallic tubes and optical fibers without restrictions on materials, sizes (diameter, thickness), number or type of fiber ribbons.
- Thin and lightweight, just like regular electric wires.
- Outstanding water- and air-tightness provide perfect environmental freedom, and allows its use outside in burial applications.
- High resistance to side pressure and temperature changes eliminates environmental tension and rodent damage.

### Picocables with connectors

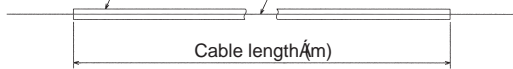
Easy installation is possible by attaching optical connectors to the top of the cables.







Stainless Steel Tube      Optical Fiber



**PICOTUBE Code Table**

Material		Inner diameter (mm)		Optical Fiber Specification			Configuration		Number of Fibers		Cable Length	
Type	Code	Type	Code	Type	Designation	Code	Type	Code	Qty	Length (unit)		
SUS304	4	0.5	05	GI	50/125	G1	Raw/Case Cable	P1	1	1 2 3 4 6 8	1 2 3 4 6 8	
SUS316	6	0.7	07		62.5/125	G5						
Incoloy	I	0.8	08	SM	10/125	S1	Fiber Ribbon	J1	2			
Titanium	T	1.0	10		8/125	S2			3			
Aluminum	A	1.2	12	HPCF	200/230	H1	2-Fiber Ribbon	T2	4	17.1 18.6 20.1 21.6	23.1 24.6	
Copper	C	1.4	14		200/250*	H2			6			
Soft Steel	S	1.6	16	MGF	200/250	M1	4-Fiber Ribbon	T4	8			
		1.8	18									
		2.0	20									
		2.2	22									
		2.4	24									
		2.6	26									
		2.8	28									
		3.0	30									

(\*Custom product)

**Stainless Steel Tube Specification Table**

No.	05	07	08	10	12	14	16	18	20	22	24	26	28	30
Material	SUS304 · SUS316													
Inner diameter (mm)	0.5	0.7	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0
Outer diameter (mm)	0.8	0.9	1.2	1.4	1.6	1.8	2.0	2.2	2.6	2.8	3.0	3.2	3.4	3.6
Wall thickness (mm)	0.15	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3
Maximum cable length (m)	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	2,000	2,000	2,000	2,000	2,000	2,000
Tensile strength (N)	59	49	118	147	167	196	216	245	421	461	490	529	568	608
Permissible side pressure (N/50mm)	2,156	1,274	1,960	1,666	1,470	1,274	1,176	980	1,274	1,176	1,176	1,078	980	1,176
Approx. cable weight (kg/km)	2.4	1.9	5.9	6.0	7.0	8.0	8.9	9.9	17.1	18.6	20.1	21.6	23.1	24.6

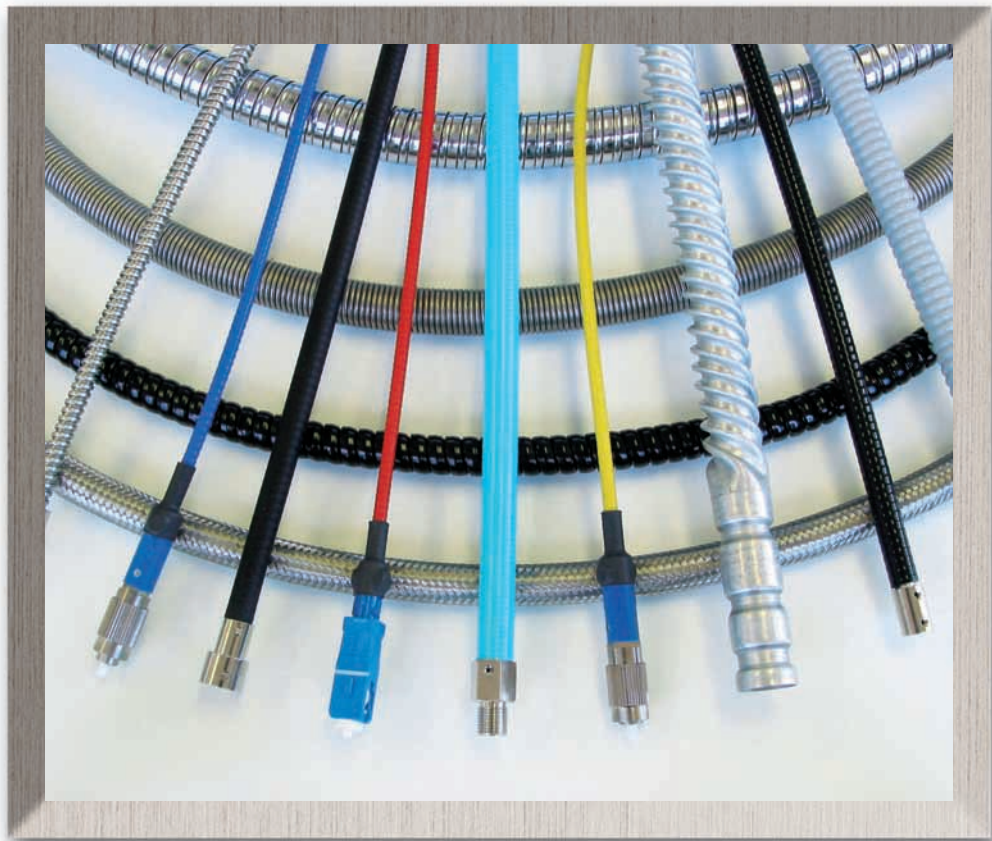
\* For other materials, please contact our sales office.

**Optical Fiber Insertion Specification Table**

No.	05	07	08	10	12	14	16	18	20	22	24	26	28	30
Optical fiber 0.25mm	1 Fiber	1 Fiber	1-2 Fiber*	1-4 Fiber*	1-6 Fiber*	1-6 Fiber*	-	-	-	-	-	-	-	-
SM/GI 4 fiber ribbon	-	-	-	-	-	1 pcs	-	-	2 pcs	-	-	-	-	-
0.5 mm fiber ribbon	-	-	-	-	-	-	-	-	1-2 Fiber*	-	-	-	-	-
Insertion diagram (Scale: 1/14)														

**Typical Characteristics of Optical Fibers**

SM Fiber			
Item	S1	S2	
Fiber	Material	Quartz	
	Mode field diameter	9.5±1 μm	8.5±0.8 μm
	Mode field eccentricity	1 μm or less	1 μm or less
Cladding	Material	Quartz	
	Outer diameter	125±3 μm	125±2 μm
Insertion loss	1310 nm	0.5dB/km or less	-
	1550 nm	-	0.25dB/km or less
Interruption wavelength	1.10~1.28 μm	1.10~1.28 μm	1.53 μm or less
Sheath	Material	Nylon	Nylon
	Outer diameter	0.9±0.1mm	0.9±0.1mm
All direction dispersion	-	-	3.5ps/km · nm or less
GI : iber			
Item	G1	G5	
Fiber	Material	Quartz	
	Outer diameter	50±3 μm	62.5±3 μm
Cladding	Material	Quartz	
	Outer diameter	125±3 μm	125±3 μm
Insertion loss	850 nm	3.0dB/km or less	3.0dB/km or less
	1300 nm	1.0dB/km or less	1.0dB/km or less
Bandwidth	850 nm	500MHz · km or more	200MHz · km or more
	1300 nm	600MHz · km or more	500MHz · km or more
Sheath	Material	Nylon	Nylon
	Outer diameter	0.9±0.1mm	0.9±0.1mm
HPCF Fiber			
Item	H1	H2	
Fiber	Material	Quartz	
	Outer diameter	200±5 μm	200±5 μm
Cladding	Material	Acrylic fluoride resin	Acrylic fluoride resin
	Outer diameter	230 ±0.1 μm	250±5 μm
Insertion loss	810 nm	6dB/km or less	6dB/km or less
Bandwidth	810 nm	10MHz · km or more	10MHz · km or more
Sheath	Material	Fluoric resin	Fluoric resin
	Outer diameter	0.5±0.1mm	0.5±0.1mm



## Company History

- 1974 - Established in Tokyo, Japan
- 1984 - Started selling stainless steel flexible tubes, beginning with small diameter stainless steel flexible tubes, such as those used as optical fiber protection tubes.
  - Developed relationships with major domestic optical fiber manufacturers.
  - Developed overseas markets and established business in foreign countries such as the United States, Germany, England, China, Korea, etc.
- 1990 - Began selling protective tubes for shower hoses, delivery hoses for water purifiers and similar applications.
- 1998 - New corporate headquarters and factory built in Yotsukaido (Chiba Prefecture).
- 2000 - Designed and began manufacturing pliable, large-bending-radius semi-interlocked tubes for applications such as dentistry tools and laser welding and processing machines.
- 2003 - Began selling lightweight and strong titanium flexible tubes for specific applications.
- 2005 - Founded a new flexible tube factory in Hangzhou, China.

## Mission Statement:

HAGITEC Co. Ltd's goal is to continue being a pioneer of stainless steel flexible tubes into the future and develop new products that meet the needs of prospective customers.







**HAGI**

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